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The Cusichaca Archaeological Project, Cuzco, Peru

A Final Report

by ANN KENDALL (1990)*

Introduction

Location and Background

The Project and the Cusichaca River are named after the small bridge point (Cusichaca - 'Happy Bridge') near the confluence with the major Vilcanota - Urubamba drainage. The Cusichaca valley lies on the eastern side of the Cordillera Vilcabamba, the watershed separating the Urubamba and Apurimac systems, which is itself an offshoot of the Eastern Andean Cordillera (Map 1). The area is about 70km north-west of the departmental capital, Cuzco, and 88km by railway. The Cusichaca river cuts its way from the foot of Mt. Salcantay, dividing the districts of Ollantaytambo and Machu Picchu (Map 2), in the Urubamba Province, Department of Cuzco. The area comprises a series of different ecological zones along the valley for 25km, from the base of snowy Mt. Salcantay at 4,300m altitude, down to the banks of the river Vilcanota/Urubamba, to 2,500m above sea level. The confluence area is a transition zone where mountain vegetation merges with the fringes of the subtropical forest.

The archaeological evidence for occupation of the area starts with the Early Horizon Period c. 800 BC for which only four sites are confirmed. However, the many later archaeological sites reflect the high level of economic activity which flourished in the region during late pre-Hispanic times. The area was intensively cultivated in the late pre-Inca period, from c. AD 900. The arrival of the Inca in the mid-15th century led to reorganisation of the zone in Pachacutec's reign, increasing the agricultural efficiency of the valley especially with regard to maize production. The economic development here which followed Inca expansion may well have been related to the construction of Machu Picchu. Three Inca roads linking Cuzco with Machu Picchu pass through the zone in question. One runs over the mountains, the other two follow the banks of the Urubamba river, passing through Ollantaytambo (Kendall 1988) and descending to Machu Picchu.

Access to the Cusichaca Valley is gained today at the Corihuayrachina bridge point to Quente, at km 88 of the Cuzco - Quillabamba railway line. The most important archaeological remains of the Inca occupation (beginning of the Late Horizon Period) are located 2km from the bridge point overlooking the Cusichaca confluence area (Kendall 1974, 1984); (Plates 1 & 2). They are now looked after by the Instituto Nacional de Cultura (INC), Cuzco, and are visited en route to Machu Picchu via the Inca trail. The main complex comprises the town of Patallacta (Plates 2 & 3) and the small ceremonial site, Pulpituyoc. This is overlooked by the promontory fort at Huilca Raccay (Plate 2). Machu Quente and the ceremonial site of Huayna Quente are located on bluffs west of the bridge point. These sites were part of the Inca development, linked by roads and with terraces and their hydraulic systems — all of which formed an integral part of land

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exploitation (Map 3) (Kendall 1974). The architectural evidence suggests that the main sites were approximately contemporaneous although Huayna Quente was added somewhat later, almost certainly after the building of Machu Picchu (Kendall 1974, 1988).

The Late Intermediate Period remains, on prominent locations in higher positions, are also associated with canals and agricultural systems. Architecture is characterised by buildings of circular form distributed around patios in layouts adjusted to the topographical features and on small terraces. The associated local pottery types resemble the Killke style of the Cuzco area (Kendall 1976; Lunt 1987).

Earlier pre-Inca occupations were first identified in layers below the Inca fort of Huillca Raccay (Q2-1), where test excavations in 1969 and 1975 revealed a sequence of deposits starting with the Chanapata culture of the Early Horizon Period, (Kendall 1976), now dated from c. 800 BC. This site shows evidence of nearly 2,500 years of occupation.

In 1977 the physical infrastructure of the past agricultural systems was found largely abandoned. Most of the canals lay neglected. Many terrace schemes were unirrigated and therefore uncultivated. Population levels in the area had fallen critically following the Spanish conquest in 1534. There is now evidence from the excavations that the Inca organisation here broke down almost immediately after the conquest. The causes for the breakdown of the agricultural systems were investigated and the project embarked on pioneering the restoration of such systems in a rural development programme.

The Cusichaca Archaeological Project embarked on a programme of fieldwork in 1977 which was completed in 1988. In 1978 a five-year contract was signed with the Instituto Nacional de Cultura (INC) to carry out a plan of work including excavations, environmental studies, reconnaissance of a wider area and an experimental scheme to rehabilitate an abandoned canal and agricultural system. In addition, research was carried out into aspects of complementary interest such as ethnohistory and ethnography, soil studies and use of irrigated and non-irrigated lands. Clearing and consolidation work was carried out concurrently by the INC under the direction of the Project's two co-directors, Jose Gonzales Corrales 1978-83 and Justo Torres Montesinos 1985, and under the supervision of the mastermason, Ignacio Aragon. From 1985 to 1988 an extension of the project programme was carried out under Resolución Suprema 1609 INC/87/ED.

A summary of the initial stage of the Project's work was presented to the IV Congreso Peruano del Hombre y Cultura Andino, Cuzco, 1978 and was published in English (Kendall 1979), and in Spanish in an expanded version (Kendall 1980). Subsequently further articles were published in the mid-stage (Kendall 1982, 1983, 1984). The present article summarises the progress made while concentrating on presenting the work carried out in the final years of the project. Interim and full reports on aspects of the project have been published, while many other full descriptive reports have remained unpublished but distributed to academic libraries in Peru and the UK (see Bibliography). A fully detailed publication will be presented in the future with related studies in two or more volumes.

The present article will review the Project starting with the latest archaeological period of occupation, the Late Horizon (AD 1438-1533), and taking chronological steps backwards through the pre-Inca periods: the Late Intermediate Period (AD c. 900 - 1438); the Middle Horizon (AD c. 600 - 900); the Early Intermediate Period (c. 300 BC - AD 600); The Early Horizon Period (c. 800 - 300 BC). The reason for this order of presentation of the data is that our

first two phases of investigation concentrated on the Inca period evidence, which dominated the area. The final stages of the investigation have provided new data on the pre-Inca occupations making a significant contribution to a continuous sequence for the area.

Objectives

The overall aims of the Project were as follows:

- a. To study pre-Hispanic cultural and economic development in a zone of high agricultural activity;
- b. To compile a local chronology of pottery produced during nearly 2,500 years of occupation, and obtain, if possible, a complete sequence of occupations;
- c. To study and interpret the function of the remains of the Inca occupation;
- d. To study the impact of the Inca occupation on the area and compare the Inca socio-economic strategy with that of the Late Intermediate Period;
- e. To assess the methodological approach and the level of recording detail required in excavation of late period highland sites;
- f. To judge how information provided by the research, together with available knowledge of technology applied in the past, may best be made use of in the rural economy of the present day. Although research was the primary aim of the project, a rural development experiment was included. This consisted of a pilot scheme for low cost rehabilitation of the ancient Andean agricultural systems (1978-83).

The Environment

(Studies were undertaken at the start of the project 1977-80).

Geology and Geography

Our area of study lies well within the tropics but the heat is counteracted by altitude. Mt. Salcantay, at the heart of the area, is at 13° 20' south in latitude and between 72-73° in longitude. At 2,800m above sea level the valley floor of the Urubamba has a temperate climate, warm dry winters and hotter, wetter summers. May to August are very dry; in January and February rain may be almost continuous. In Machu Picchu, the more tropical lower end of the area, precipitation can exceed 1,500mm per year. These contrasts in climate cause high erosion, and high soil run-off. This results in damage to agricultural land. Frosts rarely occur below 2,800m.

The following geological summary of the area is based on the study by Jones (1978). The mountains of south and central Peru form part of two parallel ranges separated by lower plateaux of sediment-filled troughs. The Andes here are founded on an old continental margin which was active through much of the Phanerozoic. The main periods of Andean deformation occurred in the Late Paleozoic. The major emergence of granites took place from mid-Mesozoic to early Tertiary and was followed by widespread uplift. Large scale disturbances in the earth's crust have continued sporadically from the Late Mesozoic to the present day.

The Cordillera Vilcabamba comprises young, high, rugged mountains with snow-covered peaks. The peaks give rise to fast flowing streams at the base of glaciers. The streams become

sluggish, threading their way across old plateaux before collecting in ungraded river beds. These rivers plunge downwards, cut canyons and wind their way through alluvial deposits and river terraces to deposit their waters in the Urubamba Valley.

The main geomorphological influence on this area is glaciation. There have been several glacial cycles, the last and most important one culminating 25,000 years ago. Glacial and periglacial processes are still very important today above about 3,800m. Glacial landforms such as 'U' valleys, hanging valleys, moraines, lakes and cirques, are conspicuous. In some valleys glaciation has left broad ridges or mountain knots. There are some well developed terminal moraines, one for instance opposite Patallacta of at least 135m high, at about 2,700m above sea level. Montana (subtropical forest) may grow directly on these moraines.

A huge granitic batholith extends from below Machu Picchu to above the Cusichaca confluence, producing dramatic gradients and topography. This section of the Urubamba valley is known as the majestic 'Canyon of Torontoy' and contrasts with the stretch between Pisac and Choquellusca which is broad and, in many places, still held between terraces built in the Inca period. Although cliffs line much of the canyon there are intermittent wider stretches of valley with alluvial fans. Throughout the batholith, coarse-grained rock is predominant. The rocks in the upper Cusichaca valley, south of the Cusichaca-Urubamba confluence, are composed of metamorphosed shales, quartzites and conglomerates.

All local valleys display sudden changes of moraine and gradient characteristic of unconformities inherent in several periods of uplift. Dykes occasionally intrude in these valleys and may be of more than one period. In the Cusichaca valley, for example, one intrudes only the metasediments and is pre-Permian, and another post-dates the granite and may be Tertiary or younger.

Because the mountains are relatively young and comprise an area of very active erosion it is very difficult to find early settlement sites. The earliest deposits are glacial in origin, consisting in the Cusichaca and Huallancay valleys of lithified morainic material, thin and intermittent veneer on valley sides and more extensive terrain at the mouths of the valleys. Through this considerable accumulation of detritus the rivers have cut their paths, sometimes creating imposing gorges. Glacial lake sediments have been deposited in depressions formed in these moraines and in the upper parts of the valleys. In the areas adjacent to the Urubamba at the bottoms of the side valleys, moraine and younger sediments have been resorted and deposited in river terrace gravels and alluvium.

Some mineral resources are exploited in the area. From the early occupation of the region, rocks have been used as a building material. Sites reflect the local building materials. The main rocks of the Cusichaca area are granite, slate and quartzite. Below the river valley granite is virtually exclusive and all the Inca sites are built of this rock e.g. Machu Picchu was quarried from the rock on which it is built. Metal deposits are recorded in the area, e.g. in the mid- to upper zones of the valley where silver, copper and lead have all been found in small quantities in the past; ores producing chrome were mined until the 1950s. Barren quartz and calcite veins are common throughout the area. Some place names (e.g. Corihuayrachina— 'the place where the gold is washed') suggest gold may have been obtained from river sands, but no vein sources are known. Silver mining was important in the north-west Vilcabamba region, beyond the area of study.

Faunal Background

In the past, wild camelids — *vicuna* and *guanaco* — almost certainly grazed in the high altitude grasslands; their domesticated counterparts — the *llama* and *alpaca* — used to inhabit the area, but have not been recorded in the upper Cusichaca and Sillque valley since the late 18th century. The guinea pig, or *cuy*, was the only other animal which was domesticated for large scale human consumption. It still lives on the floors of Indian houses throughout all the different geographical zones of the Andes.

The native wild animals present still in the hinterlands of the Urubamba Valley include the puma, the brown bear and the spectacled bear and two types of deer — the *taruka* and *ciervo*. The *viscacha*, which looks like a hare, abounds in the upper regions of valleys, and several other rodents are widespread. Birds vary from large birds of prey like the condor, eagles, falcons and hawks to small species in the lower valley. Some birds are hunted, such as the gentle high zone *warcota*, gulls, and torrent ducks along the Urubamba River. The humming bird, called *quente* in Quechua, predominates downstream of the confluence.

In the lower Cusichaca Valley, prime maize growing lands may today be grazed by cattle and horses. These animals, which are supposed to graze on the upper slopes in the growing season, often cause considerable damage to crops and agricultural systems constructed in pre-Hispanic times.

Botanical and Ecological Background

Monica Barnes, Efraim Carrillo and Eduardo Gil Moro have collected botanical specimens and produced a list of flora for the Cusichaca Trust. It shows that the vegetation of the Cusichaca Valley has been considerably affected by the continuous activity of man. Barnes (1978) found, for example, that of the 11 microzones around the confluence with the Urubamba, only 3 are not regularly exploited economically.

Tosi (1966), distinguishes between the vegetation of the lower part of the valley and that of Machu Picchu, the latter described as 'a montana of humid vegetation'. He describes the upper valley zones as rainy alpine tundra.

Barnes' report shows that the vegetation of the valley has deteriorated dramatically since earlier reports (Tosi and Vargas) but relict humid montana can still be seen in the quebradas of the area.

The 11 microzones around the confluence include arable land, eucalyptus woods, mixed pasture and warm mesothermal zones. The tableland of Huilca Raccay is dominated by two introduced species — *Psilla boliviana* (from Bolivia) and *Spartium junceum* (brought from Spain in the 16th century).

At the small settlement of Huayllabamba (2,870m) maize and quinoa are still grown but Paucarcancha marks the limit of maize cultivation at approximately 3,200m. Above this point, between Choromayo and Sisaypampa, the dominant crop is the potato of which there are many varieties. Other native tubers such as oca, ulluco and anu are grown here. Hatunpampa, at 3,750m altitude, marks the start of the high altitude puna. The land is cultivated only for special varieties of potatoes on a fallow system. Otherwise it is dominated by *ichu* grass which grows up to 4,300m. The area offers prime grazing land.

In the Urubamba valley, Quente (the area of land which gave its name to the Hacienda and

is retained in use below the confluence, but which may have extended to the full area of the Hacienda) is in the best position for control over the widest range of ecological zones. It marks the lower limit for maize (although other varieties can be adapted to grow at lower altitudes) and is not far from the zone where tropical tubers, such as manioc (*Manihot esculenta*), uncucha (*Xanthosoma sagittifolium*) and taro (*Colocasia esculenta*), can grow. It also marks the upper limit for the cultivation of nuts and other tropical fruits such as mango and papaya, and is near coca (*Erythroxylon coca*) plantations. Potatoes and other tubers find suitable niches, overlooking the confluence (today, new varieties are also grown on the valley bottom). Quente is the lower limit for tarwi (*Lupinus mutabilis*) and other edible seed crops (Barnes 1978). Maize is the most important crop. The many opportunities offered by this area make it easy to understand why it was developed in Inca times.

The vegetation now is very different from what it was in Inca times (although recently some original native species have reappeared). Local informants say that the vegetation used to be very similar to that at Machu Picchu, and that 70 years ago, before the building of the railway there were many more trees, most of which had to be used as fuel for the steam trains. The eucalyptus woods were planted in the mid-20th century to reforest two low slope areas adjacent to Hacienda Quente.

The Agro-ecological Zones

In the Andes periods of history are characterised by the ability of a civilisation to interact with, or extend its influence over, geographical zones of contrasting environments. These zones range from hot lowland desert coasts to the cold, barren high altitude grasslands and on the eastern side of the Andes, the forested slopes merge with the jungle lowlands and eventually with the Amazon basin. Six major zones were recognised by the Inca of which three are represented in our area of study in the Cusichaca valley: *Puna* (high land), *Suni* (warm temperate lands) and *Quechua* (low hotlands) (Pulgar Vidal 1946). The Inca recognised that people suffered from ill-health if they were transferred between highly contrasting zones.

The agro-ecological zones have been studied in the main Urubamba Valley by Gade (1975) and in more detail in the tributary valleys of Cusichaca and Huallancay by Farrington 1978. In Gade the three highest agro-ecological zones coincide with the broad Puna, Suni and Quechua zones of traditional Inca conception. However, the full variety and diversity of the agricultural adaptations in the tributary valleys include additional sub-zones. Farrington defined seven in the Cusichaca valley between 2,400 and 4,000m (Farrington 1979a, Table 1).

Within each of the zones, variations of microclimates (occurring naturally, or artificially by man's activities) can also be encountered. Variation in soil types can also affect the vegetation and the types of crops grown.

Settlement Pattern Studies

Reconnaissance surveys have identified 28 Inca sites and 50 pre-Inca sites in the valley system (including the Quesca and Huallancay tributaries). Plans were made of most of these sites and 19 test pits were carried out in order to obtain pottery samples for identification of occupation.

Test excavations concentrated on sites with *non*-Inca architectural remains in the mid-Cusichaca and Quesca valleys, and above Quishuarpata in the Huallancay/Jacas Drainage,

c. 3,300 - 3,800m. It was expected that these sites would date from the Late Intermediate Period, or possibly that occupation may have started in the Middle Horizon. All the sites which contained circular structures were confirmed to have been occupied during the Late Intermediate Period. Only one such site, a mixture of circular and sub-rectangular structures at Pampacahuana, contained good additional evidence of occupation in the Middle Horizon Period. At the Quesca/Cusichaca confluence, Saylla was found to be a site with earlier occupation, and several pre-Inca type sites in both valleys contained Inca pottery near the surface. However, only Yanamayo, on the Jacas River, was probably built in the Late Horizon in a *non*-Inca architectural style using the subrectangular form.

The settlement patterns of the two late pre-Hispanic periods are illustrated in Map 3 (a system of conventions is used for their major cultivation areas). It should be noted, however, that some sites may have been buried and thus missed. Further breakdown and analysis of the overall accommodation in the sites is contained in Charts 1 and 4 (Kendall 1984) which also identify the site codes used on Map 3: - Q1 - etc.. Of the 40 pre-Inca sites discovered, all were occupied in the Late Intermediate Period, but very limited evidence was found of earlier occupations.

Fieldwalking was complemented with the use of aerial photographs for photogrammetric planning of sites and land-use systems on the maps. A D.Mac digitizer was then used to provide area measurements for assessing the extent of the land under cultivation in each type of land-use system. This method of investigation was extended to the Urubamba Valley drainage from Pachar to Machu Picchu including the tributary river valleys (Kendall 1991).

The Late Horizon Period/Inca Occupation Summary

The distribution of sites shows that the classic Inca occupation of the area was heavily concentrated in the lower valley between 2,500m and 2,800m. The mid-valley occupation was organised in small self-contained sites at the confluences of the rivers where the main cross-communication systems entered and exited from the Cusichaca Valley, c. 2,800 to 3,400m. The upper reaches of the valley between 3,600 and 4,400m were dominated by well-placed observation posts with accommodation for travellers (perhaps for those on state business). Sites consisting of only one or two structures in the lower valley are roadside controls to larger sites and are not therefore evaluated separately. Particularly in some mid- upper valley positions there is surface and test excavation evidence of some continuous pre-Inca type of occupation during the Late Horizon, suggesting that the local population was allowed to continue exploiting this zone.

Late Intermediate Period Occupation Summary

A clear late pre-Inca settlement pattern shows a concentration of the largest settlements around 3,000 to 3,200m, either on ridges or in the mid-valley zones. The smaller sites are widely scattered, occurring in the low and high valley regions throughout the full range of agro-ecological zones. Certain key pre-Inca sites are in direct visual communication with each other in a system which runs from the Urubamba Valley at km 81 from Piscaycucho/Choquellusca to Olleriyac Trancapata, from Coralpata to the Quesca Valley and from mid-valley sites to the mountain passes. The other sites are in visual communication with at least one of the prominent ridge sites.

This site distribution (with a concentration of population in the mid-valley and on key ridges)

therefore straddles the major cultivation zones and provides security within the valley. The smaller sites could be viewed as farming satellites, possibly maintained by members of extended families represented in the larger settlements.

Assessment

On the basis of the settlement pattern analysis, there seem to be three reasons for the Late Intermediate Period site distribution being concentrated on high ridges and mid-valley positions:

1. To straddle the maize and potato zones in the vertical agro-ecological system;
2. To build and maintain security over the canal systems providing water to the occupation sites and for irrigation purposes;
3. To secure the population in well-defined zones with excellent visual communications with each other.

Later, in the Late Horizon Period, the Inca were able to concentrate their population in the lower valley through meeting these requirements by different means:

- a. The strength and range of their military and political domination enabled them to provide external security for the population;
- b. The efficiency and distribution of a wide range of administrative facilities to ensure uninterrupted communications and distribution networks over a much wider area could induce an input from local populations while exploiting their traditional lands in the higher ecological zones.

The priorities of the Inca were as follows:

1. To secure the area;
2. To extend maize production to support the three pillars of Inca Imperialism — the Inca elite/government, the army and the religious establishment.

The Inca occupants had similar requirements to those of the indigenous population plus the added requirement of wanting to concentrate their agricultural production of maize in the lower valley region. It follows therefore, that they would have placed their population near the prime maize cultivation areas, along a civic route offering easy communication with Cuzco. The site distribution pattern, therefore, changes dramatically, although the valley and its environmental possibilities remain the same. This change was possible because of the Inca's strength, efficiency and organisation.

To sum up, the requirements of the two populations, though similar, are revealed in two completely different strategies.

Population Distribution and Production Figures for Late Periods

Some estimate of population figures is crucial not only to the discussion of settlement patterns, but also in order to throw light on economic potential as well as socio-political organisation. While information is available on the Inca state's organisation from ethnohistorical sources, there is much less information on the Late Intermediate Period except in relation to Inca conquests. There follows in the section below an explanation of how population figures are calculated through analysis of sites (Charts 1 & 4).

As regards production figures there is no concrete information on this area in the pre-Hispanic period except that the Inca highly valued the 'Sacred Valley' (the Vilcanota/Urubamba) for its high maize yields. Calculations of the areas of land-use are used for generating potential figures for agricultural production. Any conclusions on the agricultural production have to remain speculative. It is impossible to do more than demonstrate what the land-use figures *could* generate. The figures presented in the charts indicate that there was obviously a production surplus for export or redistribution but the limitation of this kind of evidence is that we do not know for sure how much of this potential production was actually realised. However, the calculation of potential maximum agricultural production in pre-Hispanic times is positive for present day rural development objectives.

The basic figures below are substantially the same as those published in 1984 (based on Map 3). They include, however, some refinements in presentation (Charts 2, 3 & 5). One of these refinements is that the Cusichaca-Huallancay drainages are treated as a single unit, while the opposite, northern bank of the Urubamba is kept separate (Cañabamba to Torontoy), another is that more emphasis is put on potential maximum figures.

Late Horizon

As it is highly probable that the creation of a food surplus in the area was an Inca objective, arriving at population figures by equating population with the land available to support it would provide a misleading picture. The following estimate has been achieved, allowing for this factor, with other considerations such as Inca ethnohistorical data on the policies and organisation of populations in rural areas and the information it is possible to obtain from the completeness of the classic architectural remains.

Chart 1 contains a breakdown of the buildings and components of each Inca site and some of the areas of cultivation most obviously associated with them. The number of occupied household residences in the Cusichaca-Huallancay drainages is estimated at 175 buildings, each consisting of a modest one-roomed building with one or two doorways. Estimating that an average household consisted of six inhabitants (two to four children and two to three adults), the 175 family homes could have provided accommodation for approximately 1,050 permanent residents. The extra, larger-scale barracks-like facilities, totalling 30 'closed'-type buildings (and 4 'open'-type buildings) could have provided considerable additional accommodation including temporary or permanent groups of individuals officially structured on state business. At each site the interpretation of such a building varies according to its location and access; for instance, in the case of Huayna Quente, such a building functioned in relation to the shrines, possibly for housing pilgrims or for those on a rota service to the shrines. Elsewhere such buildings could have accommodated the *mit'a* — in the form of army service or a local agricultural

workforce on a seasonal basis, during sowing and harvesting work on the state terraces. On the other hand some of the barracks-like buildings could have been used to accommodate families of the Inca's *panaca*; (descendants) in the case of Patallacta, Sector I, *mitimaes* (quechua-speaking colonists) or *yanacona* (a foreign servant class). The figure of 500 - 600 people (100 families) would cover both the uncertain and possibly variable number of occupants of the large buildings and the families of the local agriculturalists living high in the drainages and not accounted for by classic Inca buildings.

To the basic accommodation-based estimate of 175 family households and the 30 barracks-like buildings of variable use and numbers of occupants, are added 60 ± 10 family residences for local agriculturalists (who, while occupying *non*-Inca sites/houses, may also have utilised barracks accommodation during sowing and harvesting seasons), totalling 275 'families' in occupation.

Regarding the potential cultivation figures (Chart 2) the following points should be made:

The Inca state terraces would all have been fully cultivated — which implies twice annually — because they were part of a specific development objective. The figure of 79 hectares $\times 2 = 158h$, which alone could have fed 4,800 people annually, outside the area.

It is highly likely that a further 56h were also cultivated on behalf of the Inca state since Inca canals were introduced and/or earlier canals were re-routed, indicating these areas were to be efficiently cultivated. For example the Quishuarpata canal — which irrigated terraces originating in the Late Intermediate Period — was rerouted. In fact, it would seem this was true of terrace systems in the lower valley areas. These land-areas were also likely, therefore, to have offered potential for twice annual cultivation, totalling another 226h.

Lands not usually under irrigation, such as the high slope field systems, add up to 562h. These would have been left fallow (for an estimated 7 years after 3 years of possible cultivation), which reduces the annual cultivation estimate on them by 70%, i.e. to 168h.

The land required to sustain an average family was, according to ethnohistorical sources, about one *topo* (a Quechua term for a plot equivalent to approximately one third of a hectare). This is consistent with present usage. One third of a hectare, therefore, should have been sufficient to support an average rural family at the subsistence level.

The maximum potential figures are set against estimated population as follows:

175 buildings + 30 barracks + 60 ± 10 non-classic buildings = 275 buildings maximum.

Total of 275 buildings/families (1650 people) cultivating a potential maximum 2264 topos, results in 8.2 topos per family, or the feeding of 13,584 people.

For comparative purposes the figures of the nearby Urubamba north bank are also outlined for the Late Horizon Period of occupation, (Charts 1 and 3). These demonstrate that surplus expectations in other Inca developments could have been even higher:

27 buildings/families (162 people) cultivating a potential maximum of 407 topos, results in 15.1 topos per family, or the feeding of 2442 people.

If we try to reconstruct some of the constraints on these potential maximum production figures, they will, of course, be reduced. During the Inca occupation these would have been reduced by a number of factors including: wastage, needs of local administration/government entertainment and other contingencies such as support of local shrines (including food offerings).

While there is no doubt that most of the excess was exported (there are virtually no storehouses in the area — with two possible exceptions, see also note 1 and Kendall 1991) it is impossible to give figures on the amount. This evaluation of the maximum potential of the developed agricultural systems, however, demonstrates the capacity of the area for sustainable agriculture today: it could support 13,584 people if the ancient agricultural systems are maintained and where necessary rehabilitated. (The high altitude puna zone has not been included for its additional contribution to the agricultural production figures, but it provides a considerable area of pasture for animals and marginal land suitable for potato cultivation under a six year fallow system).

Late Intermediate Period/late pre-Inca occupation

Chart 4 shows the analysis of building forms present in the sites classified (in some cases tentatively) as Late Intermediate. Since some of these figures are estimates, we have only a rough figure of 410 buildings overall. The population estimate is affected by the modest size of most of these structures and by the lack of an associated variety of architectural types such as open structures, structures of access (in Sector II groups at Patallacta), and barracks-like buildings for communal accommodation. A permanent population figure could be close to that estimated for the Inca period. However, the 350 plus year period of this occupation as opposed to the 80 to 90 year period of Inca occupation should also be taken into account, as should the possible doubling up of some accommodations at large and small sites in a vertical agro-ecological system. On the other hand, landslides and Inca terrace developments may have obliterated some sites.

An occupation estimate should take into account the small size of most buildings as well as the structure of the extended family engaged predominantly in an economic strategy which exploits more than one zone in the agro-ecological system (Murra 1972). Taking these considerations into account, a population estimate for the end of the Late Intermediate Period, based on the known number of buildings, can only be very broad.

An estimate of the area cultivated (Chart 5) is even more difficult to arrive at because, in addition to the difficulty of dating the high slope field systems, the Inca agricultural systems cover pre-Inca landscapes.

The figures (Chart 5) summarise the available data without considering the possibility of two annual crops on irrigated terraces. It must be borne in mind any conclusions hazarded for this time period must be largely speculative. While production levels are evaluated in the chart as being around 1253 topos potentially annually, they *could* have been almost as high as those potentially obtained by the Inca. In either case a redistribution/export of some produce is a high probability and may provide an interesting insight into the socio-political structure for this period.

The question arises of where such a surplus might have been destined for redistribution? — pre-Inca **Tambo** (Ollantaytambo) or the Maras area where the **Ayarmaca** (a pre-Inca ethnic group) (Rostworowski 1969/1970) had their capital (Sarmiento 1572) at altitude 3,600m. This could be the first archaeological evidence to support the idea of regional federation, with the pre-Inca Ayarmaca playing a dominant organising political and economic role just north of Cuzco

(Map 4; Fig. 7). This challenges the picture of fragmented inter-group squabbling presented by the Inca accounts of local pre-Inca history. In fact, taken together with the ethnohistorical accounts recorded by Sarmiento and other colonial historians, it is more likely that it was the Early Inca who were the disturbers of peace as they sought to dominate their neighbours.

Occupation pre-dating the Late Intermediate Period

Away from the prime excavation sites at Huillca Raccay and Patallacta evidence for occupations pre-dating the Late Intermediate Period was sparse. This took the form of a) sherds in walls, and very rarely surface pot, and b) the results of test excavations penetrating under Late Intermediate Period deposits.

There are at present gaps in the archaeological record for the earlier occupations at Huillca Raccay (Q2-1), between the Early Intermediate Period and the Middle Horizon for which explanations must be sought. Although many areas have been fieldwalked there was no systematic trenching of fields at Cusichaca which are nearly all terraced. Our present excavation evidence shows that some sites of these periods are deeply buried under occupation or agricultural systems of the late periods. Reconnaissance in a wider area has shown that a few early sites occur in key positions on promontories along the Vilcanota/Urubamba drainage and at confluences with tributary valleys.

Middle Horizon

The pan-Andean Middle Horizon style (AD 600-900) as represented by the Huari style and the phases/epochs identified by Menzel (1964, 1969), is found at only one site in the entire valley drainage—Pampacahuana in the upper Cusichaca valley. Here Middle Horizon pot closely resembling the Huari style was found. Although no Huari sites have been identified in the lower valley, the evidence for continuity of occupation on Huillca Raccay suggests that undiscovered Middle Horizon sites probably do exist. It is expected that this period is represented largely by utility wares with some continuation of local styles of building. The Huillca Raccay tableland site (Q2-2) contains evidence for a Middle Horizon period occupation.

Early Intermediate Period

The identification of Early Intermediate Period sites only became possible at the end of the project, when this occupation was clearly identified on the Huillca Raccay promontory site (Q2-1: Area 6). It is expected that this period is also represented under late occupations at two other large sites in the area, Q1 and Q2-2.

Early Horizon Period

At present 3 or 4 Early Horizon Period sites have been identified in the Cusichaca valley—on Huillca Raccay promontory (Q2-1), at Saylla beside the Quesca-Cusichaca confluence (test pits in 1983 confirmed this), and at Machu Quente, where unstratified sherds were found in a test pit. A few sherds were also found under Patallacta.

No occupation has been found pre-dating the Chanapata culture of the Early Horizon at Cusichaca—perhaps because the area is geologically young. To date, the closest sites which pre-

date Chanapata are the Marcavalle site in Cuzco c.1200 BC (Chavez 1982), and sites in Andahuaylas dating from the Initial period (Grossman 1972, 1983). The Marcavalle site and its characteristic pottery style was found under deep stratigraphy in the Cuzco valley floor. Mohr Chavez identified the Marcavalle site as representing the earliest ceramic-using inhabitants of the Cuzco area and possibly its first occupants (Chavez 1982). The valley floor in the Cusichaca valley (and along the Urubamba valley) has been subjected to high erosion and two late periods of intensive terracing activity which would create difficulties in finding such sites if there was a similar occupation of this area. Also, the area was probably forested with subtropical vegetation and may not have been attractive to early agriculturalists from the puna and suni zones when broader valleys without forest were available elsewhere.

No pre-ceramic sites in Cuzco or Cusichaca are known, although they are in Espinar and adjacent areas throughout the Andes. Early cave sites have provided the best evidence for the pre-ceramic development (MacNeish 1971; Danielle Lavalley 1975; Astete 1989—pers. comm. — in press, etc.). In the Cusichaca valley there are some caves on the steep valley sides but those which have been examined contained late period burials.

However, to balance this assessment, the confluence area and the Urubamba valley generally would have been an ideal area in which to maintain an initial settlement in a central position between different resource zones practising slash and burn agriculture. The identification of such a site in the area — between Cusichaca and Ollantaytambo — under late terrace systems, would require a considerable amount of fieldwalking and trenching.

The Cusichaca valley and its adjacent hinterlands could theoretically have been attractive to mobile pre-ceramic groups combining hunter-gathering activities. The high altitude grasslands of the puna zones around Salcantay and Quesca extend to Mollepata, Sillque and Huarocondo. Reconnaissance in these areas confirms suitable grazing areas, water sources, and cave sites. The latter should be investigated by a pre-ceramic specialist for evidence of early occupation (Kendall 1982 ms Reconnaissance Report *CAP*).

The Excavations

The Main Sites (Map 3)

Huillca Raccay (Q2)

The glacial moraine which divides the Cusichaca and Huallancay valleys comprises some 35 hectares of arable land. It slopes in variable gradients from the base of the Quishuarpata bluff at 2850m to high cliffs overlooking the valleys and confluence areas along the edges of the upper tableland and descending at the northern side to Chamana and the confluence area (Map 3).

The upper tableland area was widely terraced and irrigated in the Late Intermediate Period (evidence confirmed in Q2-2 excavation 1982 and 1987). Fieldwalking over its eroded terrace system reveals an occasional pottery sherd. Larger concentrations of evidence of past occupations occur in various locations — at the top SW side of the upper tableland for example. The Q2-2 site is contained in the middle of the upper tableland and consists of a substantial area of standing architectural remains including one-roomed buildings of round, oval and rectangular forms, as well as mixed irregular forms. Q2-1 is a promontory of an irregular oval form overlooking a terminal moraine across the Cusichaca valley and dominating its access (Plates 1 & 2, foreground).

There are three further small sites around the NE end of the upper tableland. One is a small round promontory-like threshing area marked by a small building of access, Inca-like in style. Between this and the main Q2-1 promontory a circular structure overlooks Chamana and the Cusichaca confluence area. To the east of the threshing area a small and very eroded platform marks the point of descent of the Inca road into the Huallancay gorge. This road once crossed the tableland from the platform to pass the Inca fort site (on the promontory) from whence it descended to the Cusichaca valley.

The middle section of the moraine drops away in a variety of steep slopes, until the ground levels out again to an extensive area of more gentle gradient comprising the lower tableland. Vestiges of terraces and a canal system are marked by stone walling, and occasionally a few pieces of surface pottery. No investigation has been made of the sites where Late Intermediate pottery appears; these locations may represent isolated house groups. Any further investigation of this area would have to be by field trenching.

Quishuarpata (Q4)

Quishuarpata overlooks the lower Huallancay drainage and the Huillca Raccay tableland. It consists of a small tableland of some 10 hectares of arable land which was terraced in the Late Intermediate Period, and irrigated at least since early in the Late Intermediate Period. The southern part of the tableland includes an extensive Late Intermediate Period site of some 80 buildings over the high part of the site (Q4-2). At the northern front edge a small Inca site (Q4-1, Fig.10) of six buildings was built around two courts in the Late Horizon Period. It has commanding views over the Huillca Raccay tableland and adjacent areas.

Patallacta (Q1) and Pulpituyoc (Q1E) (Figs 7 and 8)

The Inca town of Patallacta is laid out on the top terrace of a generous alluvial fan formed beside the confluence area. The town contains 113 surface structures of the Late Horizon Period. A canal system enters it from the gorge point to deposit water in a series of fountain-baths beside a stairway cutting the terraces supporting the town. The lower area of the alluvial fan is broadly terraced; at the riverside it is attractively landscaped by terrace systems. A canal and road enter from the south to follow the terraces which are overlooked by control points (Map 3; Plates 1 & 2).

Pulpituyoc consists of 11 buildings on, against, and around a large rock at the river's edge, marking the second access road to the site.

Machu Quente and Huayna Quente (Q10) (Map 3, Fig. 9)

These two sites are located on bluffs separated by streams at the side of the Urubamba valley marking the NW extent of the widening of the main valley. An access road to Huayna Quente passes round and up Machu Quente and Tiendachayoc to cross a steep quebrada stream into the higher Huayna Quente site area. Both sites are terraced, the entire area of the sites and lands adjacent to the confluence area is landscaped with Inca terraces of the Late Horizon.

There is further evidence of occupation above the valley floor on the bluff of Tarapata (two sites), and on the slopes where eucalyptus woods are now planted. Few surface sherds were found in the wood and many of the surface remains here probably post-date the Inca period.

Olleriayoc Leoniyc (Q3) and Olleriayoc Trancapata (Q5) (Map 3)

These two sites are named after the long ridges on which they are located, respectively on the west and east sides of the morainic tablelands of Quishuarpata and Huillca Raccay.

Olleriayoc Leoniyc consists of some 35 stone-built structures of circular to rectangular forms dating from at least the Late Intermediate Period. Olleriayoc Trancapata has some 80 circular buildings all of the Late Intermediate Period (Kendall 1976b) (Plate 4).

Excavations started in 1978 on the Huillca Raccay fort site (Q2-1). The site was already identified (Kendall 1976) as holding the stratigraphic key for the area. Between 1979 and 1988 excavations continued to concentrate on this site (Fig. 6). In 22 site areas and buildings excavated many showed evidence that previous occupations had been truncated by the Inca terracing of the site and 18 revealed pre-Inca occupations. From 1981 the excavation programme was extended to other sites of the Inca complex — Patallacta (Q1, Fig. 7), Pulpituyoc (Q1-E: Fig. 8), Huayna Quente (Q10: Fig. 9), Quishuarpata (Q4-1: Fig. 10)— and to pre-Inca sites on the Huillca Raccay tableland (Q2-2) — Quishuarpata (Q4-2), Olleriayoc Leoniyc (Q3) and, in 1987, Patallacta. Nearly half a million artifacts were recorded and processed.

There are several causes of destruction of archaeological evidence in the late period sites: disturbance of deposits by vegetation, roots and animals; precipitation; and the activities of *huaqueros* (treasure hunters) and agriculturalists. The Late Intermediate Period occupations may suffer, for example in the Huillca Raccay fort site (Q2-1), from Inca levelling and reoccupation. There is also a constant risk of contamination of the cultural material where mud mortar was made and wall surfaces plastered with material including that from previous occupations. When these walls deteriorated the plaster and mud mortar decomposed and the materials were scattered to be mixed in with other occupation deposits.

Despite these problems stratified contexts have been excavated for the late periods found on or near the surfaces of sites. It was project policy to assess techniques for working in these conditions on exposed sites with a low incidence of clear stratified contexts, because such conditions are commonplace on an enormous proportion of sites in the highlands. Generally, by excavation in shallow spits and planning-in of all finds in late period area excavations, it was hoped that a) chronological differences in artifact assemblages would be revealed, and b) non-random spatial distributions of finds would lead to the identification of activity areas. The technique permitted some interpretation/reconstruction of destroyed or disturbed features in these upper levels by overlapping the spit plans.

Late Horizon Period (Inca occupation)

The excavation programme first concentrated on the Huillca Raccay fort (Q2-1) because its modest size would permit both an intensive and extensive area strategy, which would at the same time reveal those zones rich in pre-Inca deposits (Fig. 6). Complete excavations of examples of all the different types of buildings were carried out together with partial excavation of patio and passage areas. Similarly at Patallacta, a much larger site containing 110 buildings, the strategy was to excavate one complete unit in each of the four main residential sectors. These units

comprised a much smaller percentage of the total site area than that excavated at Q2-1. In the ceremonial sites of Huayna Quente and Pulpituyoc only a sample of each of their two main sectors was excavated: each site comprises a sector of shrine and of domestic buildings. At Quishuarpata one of the six buildings of the site was excavated.

Excavation priorities were to look for the following types of evidence in buildings 'B' and open areas 'A':

1. Evidence for further forms of architecture built either as temporary structures in open areas, or as sub-divisions of buildings and open areas;
2. Features associated with structures indicating particular activities: including, for example, down-grading of floors, platforms, etc;
3. Non-random patterns and types of floor surfaces indicating functional changes and phases of occupation within the Late Horizon;
4. Building modifications and re-laying of floor surfaces indicating functional changes and phases of occupation within the Late Horizon;
5. Evidence of the building practices of the Inca builders;
6. Location of stratified Inca contexts which might provide evidence for identifying phases of Inca occupation subdividing the Late Horizon c. AD1450-1533 (or even pre-dating the Inca presence here in this period to the end of the preceding Late Intermediate Period).

Virtually no evidence was found either for temporary structures or sub-divisions or structures within the site areas. There are no additions to be made to the known variety of classic Inca architectural forms (Kendall 1974/1985). All stone-wall subdivisions are either late modifications or post-Inca (Plate 6). However, in some cases post-holes have been found cut into floor levels of buildings and these may either have supported a loft or formed temporary features indicative of activity areas.

The evidence of some Inca period post-holes comes from Huilca Raccay fort (Q2-1) and Patallacta town (Q1). In B20, at the fort, several post-holes were found in a central line (Plate 5), and in B2 at the fort, three post-holes were cut in sub-soil in line with the south edge of the doorway. In the northernmost unit of Sector II at Patallacta, all three of the small buildings contained post-holes cut into the floor make-up. In all of these instances, the post-holes are interpreted as having held posts which supported a *marca* (storage loft)¹. Local ethnographic evidence confirms the continued use of storage lofts in houses, which are still referred to as *marca*. In another instance, in B68, Sector III of Patallacta, a stake hole with small stones cut into a poor floor surface pre-dating the occupation deposits, could be interpreted as a post-hole for scaffolding during the erection of the building. In B18 and B19, Sector II, post-holes against the inside edges of the doorways must have been for a door.

¹ *Marca* is a term used in the chronicles and particularly for the second storeys of large Inca buildings (Guaman Poma). These comprise the only recognised facilities at the Inca sites of the area and are distributed for internal storage (Fig. 1, Chart 1).

The evidence for points 2, 3 and 4 is found in varying degrees at the different sites. For instance, there is evidence of some building modifications at Huillca Raccay and Patallacta, but there is little or no evidence for building modifications at Pulpituyoc, Huayna Quente and Quishuarpata within the Inca period. Although it is unlikely, this does not exclude the possibility of the addition of a complete single structure at Pulpituyoc or Huayna Quente. Patterns and types of pottery evidence are discussed below, and by Lunt in 'Late pre-Inca and Inca pottery' below.

Excavation has revealed a variety of features within the Inca buildings, including the following:

- stone furniture— natural boulders incorporated either in, or free-standing from walls of buildings or areas (Plate 8); they can provide ledges, surfaces for use and seats;
- benches built against an inside wall (e.g. B1 Huillca Raccay fort); platforms with or without stone edges (with at Patallacta B68 and B45 (Plate 7) and Huillca Raccay fort B27, and without at Huayna Quente, B5 (Plate 9);
- clay-lined depressions and surfaces (although it is sometimes difficult to distinguish between these and patched floor surfaces); occasional pits, usually in a corner;
- pottery occasionally deliberately positioned between floor levels and in floor surfaces;
- votive offerings usually against a front wall but also found within a re-laid floor and, in the case of B68, within the possible division wall or platform;
- stone-built door thresholds, usually built as an integral part of the structure.

The wear and downgrading of the floor differs radically from building to building and site to site, and is difficult to recognise. This subject will be discussed in relation to building modifications and methods of excavation below.

There is evidence too for the organisation and sequence in which the building projects were carried out. Even before excavations began it seemed likely that the fort would have been the first Inca building project in the area, because it dominates the fertile confluence of the Cusichaca and Urubamba rivers and might have afforded some security and control to the inhabitants. The promontory site was levelled and extended so that it offered an area of 150m x 50m divided into four terrace levels. Probably about 28 buildings were initially built. During their construction the builders may have been housed about 100 metres away on the Huillca Raccay tableland site (Q2-2), where some structures occur associated with Inca and pre-Inca pottery types of the late Late Intermediate Period (Kendall 1976b/1985). It is suggested that this Late Intermediate Period site was either reoccupied or continued to be occupied at the beginning of the Inca occupation/Late Horizon Period.

On the basis of an assessment by the INC mastermason working on the consolidation programme, it takes one man four hours to rebuild a square metre of stone wall to the standard of the Cusichaca masonry style at Patallacta. Since numbers of workers were not severely limited

in Inca times, it is possible that the fort could have been built in a single season of work, between the agricultural seasons. There is no clear evidence here to support the idea that construction was carried out in stages, whereas at Patallacta there are some distinctive course lines, which appear either between terraces and buildings, or high on the back walls of buildings. This does suggest at least a seasonal break in the building activity. This large site and its extensive terracing works must have taken at least five times as many work days as the fort.

All main building materials are available close to the site. Granite predominates while slate, quartz and agglomerates were used on each site in quantities equivalent to their local availability (Jones 1977).

Further evidence for construction materials and construction organisation comes from Patallacta where a series of approximately circular mounds extend in a line north of the town along the front terrace. A segment of a mound was excavated in 1979 and was found to be built up of successive soil lenses containing pottery of the Late Intermediate Period style. This accumulation of soil was almost certainly for construction purposes. Excavations at Patallacta revealed the order of construction of some buildings within a compound area. Another example for the evidence of building practice comes from Patallacta B16, Sector I, where deep foundation trenches and misjudged threshold heights revealed that the Inca builders did make some errors of judgement in measuring levels, which then had to be corrected. In Huillca Raccay (Q2-2) evidence shows wall foundation cuts to be shallow, especially in comparison to those at Patallacta. Also, they are often absent beside walls based on high bedrock.

At Huillca Raccay fort (Q2-1), there are two good examples of architectural modifications which may be interpreted as representing changes in function. It should be noted that these are at the east and west extremities of the site in the most strategic positions.

In B1, Group 1, the blocking of windows and modification in the front wall of this building suggests the 'closing' of the structure, perhaps for subsequent use as a habitation.

In B28, Group 4, wall footings buried under the floor provide clear evidence of an earlier structure. A wall fragment, 145cm long by 75-80cm wide, runs N-S and survives to a height of two courses. It appears to be of the Inca type and is set in a trench or depression on soil containing a few fragments of Inca style pottery. This wall may represent remains contemporary with Group 5. B28 is a building with curved front and back walls following the topographical edge of the site. Full-length windows are set in its back wall overlooking the path behind it. Since there is only one other example of this architectural form — at Runcu Raccay on the Inca trail — it probably represents a type which post-dates the rest of the site's architecture. This part of the fort was remodelled in order to control access through the site between Groups 4 and 5. The sunken path between the groups must have been deliberately cut when B28 was built, the paved road subsequently being washed away. In addition, the remains of a structure consisting of two compartments was built across the middle of B28 whose floors it overlies. This structure post-dates the construction of the main building and its form suggests it functioned for storage.

At Patallacta it was expected that excavations in the domestic and administrative buildings would furnish good evidence for different activity areas during the Late Horizon occupation. However, this task was complicated by the past activities of the 1915 Yale Expedition which had interfered with the archaeological contexts: the expedition archaeologist E.C.Erdis organised 'pot-hunting' pits in every building at the site in order to add to the collection of artifacts (Erdis' day-book 1915).

The Pulpituyoc (Q1-E: Fig. 8) and Huayna Quente (Q10: Fig. 9) excavations began in what were assumed to be the domestic units serving the shrines. In the former site there were three successive floor surfaces in B10, but the range of finds in this and other buildings was low, and similar to other sites. In the latter site (Q10), B5 contained two low platforms in a well-preserved state which suggests little use (Plate 9). The small number of finds in B5 combined with the relatively fresh condition of the platform surface suggests it was not long in use. In addition to the small number of finds it is likely that this structure's platforms were for sleeping², and/or that the site was not long in use before it was abandoned. The small amount of pottery in B5 was offset by the greater quantity found in B4, a slightly larger structure in the same group. B4 was excavated in order to obtain a fuller range of activity information as well as an increased pottery sample in the domestic area of this site. B6, also sampled, appeared to contain evidence for a food preparation area. Excavations also investigated the shrine areas where there were remarkably few finds, none at all in B8 at Huayna Quente, and virtually none were found discarded on the terrace below the structure.

In contrast to Huillca Raccay fort and Patallacta, Huayna Quente and Pulpituyoc were built on previously unoccupied sites. The patio area A7 at Pulpituyoc was shown to overlie a cultivated soil. The excavations at both sites showed some dramatic changes of function in the post-Inca period. Those suggested for this century are confirmed by local inhabitants and include storage, corralling and camping use.

At Quishuarpata (Q4-1) the Inca structure excavated, B4, contained an assemblage of pottery which was interesting in that it was most comparable with that of Sector II, Patallacta (Lunt, 1987). This reveals a lower status of occupants in these two resident groups.

While the architectural studies of each Inca site of the lower valley complex (Kendall 1974, 1985) have provided some broad and some more detailed hypotheses for interpretation of the function of buildings and open areas, the results hoped for confirming these interpretations and for identifying more detailed activity areas by artifacts have not been fully realised. It was mainly to attain this objective that the project experimented with the meticulous and time-consuming method of registering finds 3-dimensionally and planning distributions of artifact fragments. One of the reasons this method did not provide the results hoped for was the scarcity of finds from occupation levels.

There are three possible explanations:

- i. a large proportion of the cultural material was removed when the Inca sites were abandoned;
- ii. the general high standard of cleanliness of the occupants resulted in the disposal of broken/unclean remains onto the terrace or slopes below the sites;
- iii. in fact, in reverse to the accumulation, the deposits diminished due to erosion, wind and human activities such as sweeping.

Floors were found to be worn, probably swept leaving original fragments only against the walls. The message to the Inca archaeologist is clear. Except in cases where a site is believed

²Low sleeping platforms are mentioned in the chronicles (Guaman Poma, etc.)

to have been abandoned suddenly, destroyed or sealed quickly by a disaster it is not worth investing time-consuming methods of excavation; the trowelling technique combined with the bagging of finds by 50cm squares in each archaeological context is more than adequate in most cases; 1m squares is adequate in open areas.

One functional alteration, which shows a dramatic change/cultural event, can be seen in the evidence of the canal excavations at Patallacta. Originally the excavation was planned to trace the channel from the gorge point to the highest of the five baths lining the principal stairway of access to the site. A series of burials built over and dug into the channel containing pure classic Inca fine wares showed that the Inca occupation came to an abrupt and disorganised end with the Spanish conquest.

None of the sites excavated (with standing classic Inca architecture) contained post-building evidence of distinctive phases of Inca occupation (see Pottery Report) except in cases of changes of function visible in the architecture. The finds record reveals a significant percentage of Killke-related pottery in the Inca contexts, but this is considered to represent a local pottery tradition whose pots continued in use and which continued in production.

Pre-Inca Periods - Strategy

In attempting to find and identify the earlier occupations in order to complete a chronological sequence for the area the aims of the pre-Inca excavations were to:

- a. locate in time (stratigraphy) the first evidence for Inca trade influence, and/or pre-Late Horizon occupation in the area;
- b. identify the pre-Inca cultures and describe these in as many of their aspects as possible: i.e. architecture, layout, artifacts, economy;
- c. find a full or continuous sequence of occupations, ideally all in one excavation;
- d. extend the investigations from the key site to other sites in order to obtain a fuller example of a single period site of a particular occupation, or to locate an occupation not represented at the key (Q2-1) site.

The levelling and extension of the Huilca Raccay (Q2-1) promontory site during the construction of the Inca fort disturbed, and to some extent removed, the earlier deposits. In fact it was found that terracing had occurred in pre-Inca periods. In other instances pre-Inca terraces and buildings had been preserved by being incorporated into terraces and covered with levelling fill. Gill Hey was the Excavation Supervisor in charge of the fort excavations from 1979.

Late Intermediate Period

This is the period which is most affected by Inca terracing on Q2-1. At this site beneath the excavated Inca occupations levels, a total of seven circular structures were revealed in A1/B1, A6, A30, B26(?), B17 and A22, with burials and truncated features. In A22 a sub-rectangular structure overlay the circular structure, the former being associated with a few Inca sherds amongst a predominance of Late Intermediate wares. Both were sealed beneath the rubble fill deposited over this part of the site by Inca builders.

Excavations have revealed more remains of floor areas than walling. Areas were first terraced and circular structures built on them. These excavated circular structures show the following features (Hey):

- stones are set into shallow trenches, or into the terrace surface;
- evidence for walls is limited to single-stone thickness found in the few surviving walls. The stones are laid in mud mortar and wall width does not exceed 60cm;
- lumps of adobe suggest that adobe bricks may have been used in construction but these lumps may simply be thick mortar;
- hard-beaten earthen floor surfaces (3cm depth) sometimes have extra clay incorporated;
- single doorways are expected but there is rarely surviving evidence on this site;
- features outside the structures but associated with them include many refuse pits, shallow gullies and post holes.

The sub-rectangular structure in A22 post-dates a circular building, and represents the latest phase of the Late Intermediate Period on the fort, before the Inca occupation (Plate 10). Its dimensions are 5.80m x 2.80m and wall width 0.50m. The west and north walls had two faces and the east wall a single face, and was on a ledge above the floor level. A single entrance in the west was replaced by another further south in the same wall. To the north of the building several vestiges of walling were contemporary but not joined. These could represent corralling for animals since there is no evidence for a floor surface.

The Q2-1 site excavation contributed a range of evidence which extended that known on surface sites but did not contribute information on architectural styling. The A22/B17 area provided important evidence of phases within the Late Intermediate Period occupation, useful for the pottery chronology. This has led to the identification of phases within a continuing sequence of occupation.

Since the levelling activities of the Inca builders critically interfered with this site and Patallacta (Q1), particularly in removing most of the architectural evidence, other sites with late pre-Inca style architectural remains were also investigated.

The pre-Inca remains at *Quishuarpata* (Q4-2) cover an area of 3-4h and consist predominantly of circular structures, with five large oval structures arranged around patios on rocky slopes and level site areas. Small irregular platforms amongst the remains are bounded by terrace systems. On a level central area two long oval buildings, notable for a midwall section in their otherwise open facades, face each other across a court. These structures are associated with a large rock, under which there are remains of burials. Half of one of these structures and a typical circular building (Plate 11) were excavated in 1981. Both contained utilitarian, much abraded Late Intermediate Period pottery wares.

The ruins of *Olleriyoc Leoniyoc* (Q3) occupy a 350m length of a narrow ridge overlooking the Cusichaca and its Urubamba confluence point. The remains consist of three main sectors

containing predominantly elliptical and oval-shaped buildings and eight small sub-rectangular platforms. There are also two rectangular structures at the site. The sectors are defined and separated by 'cuts' and high lateral walls. An oval structure (B1), expected to be of the Late Intermediate Period and post-dating a canal which ran through it, was first selected for excavation. At the eastern side of B1, the ridge was found to have been extended by levelling to accommodate the structure. Pottery of the Late Intermediate Period was obtained from the excavation fill. The presence of sherds in the lateral wall of the site and in some structures' walls, as well as the variety of straight and curved forms of structures, indicated several phases of building. Excavations of several depressions and stone-lined pits on a rectangular platform and two other ridge top locations were also carried out.

In 1975, at *Olleriyoc Trancapata* (Q5), two buildings of circular-elliptical form were excavated. The material obtained was from two phases of occupation but, since the earlier consisted only of a small layer of fill beneath part of one structure, the material was inadequate for clarifying any stylistic differences in artifacts.

The sprawling surface site on the *Huillca Raccay tableland* (Q2-2), was also investigated. The site comprises non-Inca (non-classic) architecture of squarish and mixed forms and circular-oval forms representative of the Late Intermediate Period. In 1969, several small test pits were dug at the site which revealed a Late Intermediate occupation overlain by a large quantity of Inca pottery (Kendall 1976). In 1982 an irregular squarish structure, B4, was excavated. It was found to contain classic Inca pottery and its front wall was built over a stone-lined pit containing a concentration of pottery, later identified by comparison with wares of Middle Horizon utility type. B4 on Q2-2 was useful for examining the continuation of the pottery sequence from the Middle Horizon to the Late Intermediate Period. The oval building, B3, also excavated at this site, led to an important discovery of a buried site, see Q2-2 below.

The Middle Horizon Period

Although there was Early Horizon material of the Chanapata culture found underlying much of the Late Intermediate occupation of the Huillca Raccay fort site (Q2-1), the project was not able at first to identify areas in this site which contained the intervening occupations expected, of the Middle Horizon and Early Intermediate time periods. In A22, some flexed burials cut the pure Chanapata material and underlay the Late Intermediate Period occupation. (Later, distinctive crouched burials found in the cemetery level of A6 were identified as belonging to a phase of the Early Intermediate Period or occupation.) Since A22 contained no Early Intermediate Period or Middle Horizon occupation, we had to look elsewhere for this part of our chronology.

In 1982 on the Q2-2 tableland an excavation set out to assess the relationship of the oval building, B3, with the terrace against which it appeared to abut. As a result an important new site was found, the origin of which considerably pre-dated the Late Intermediate Period. This site was sealed under the terrace fill behind the oval structure B3, whose back wall sealed the terrace. The relationship between B3 and the terrace wall was first investigated by means of a trench. A substantial wall indicated that the architectural remains of the buried site were different from any known pre-Inca sites in the Cuzco area. The following season the terrace was stripped of its top soil and fill to reveal a fascinating complex of massive stone walls. These walls, between 1.5m and 2m wide, were faced at each side with single lines of large facing stones holding between them

a rubble of small stones. They were built to create passages, and surrounded an approximately oval or sub-rectangular structure³ (Plate 12) with a stone clay-lined bench or altar against its back wall. On the bench but not necessarily contemporary with it lay a deer antler and pottery. The antler was dated to between AD 340-600 by the Godwin Laboratory using the radiocarbon method⁴. The pottery appeared to be a forerunner of the Killke style, with similar traits to the Qotacalle style known in the Cuzco valley, and is identified by Barreda, McEwan, and Lunt (1989 pers. comm.) as Cuzco area Middle Horizon. No other pottery or artifacts were found in this area to help date the architectural style. The limited evidence suggests a late phase of the Early Intermediate Period which may have continued in occupation up to or into the Middle Horizon (Fig. 11).

In 1985 an extension of the excavation revealed a series of very wide zigzagging walls which defined the formal court area (Plate 13). This must have been the focal point of an early community approximately contemporary with the Early Intermediate Period date suggested by the antler. However, a feature (Plate 13) overlying the centre of this court was found to contain a few pieces of utilitarian provincial Middle Horizon pottery. Although the pottery was not conclusively associated with the important architectural remains, it reinforces the interpretation that the remains were either still in use at the beginning of the Middle Horizon, or were at least still exposed and partially re-occupied.

A final extension of excavations at this site in 1987 provided additional evidence (Plate 14). In the northeast extension was found the deepest part of the site where a massive, curving wall measuring 2m wide, cut an earlier, straight, narrow foundation wall (Plate 15). This pre-dated all other building at the site. The east side extension, dug in the same year, revealed, under a shallow agricultural soil, poorly preserved features, possibly of an occupation sector; post-holes, pits and fragments of wall foundations were cut into the natural surface. A deep pit, cut into the natural surface, was similar in form and type to another pit underlying a Late Intermediate Period structure, B4 (excavated in 1981), cut into natural moraine of the tableland site. The 1987 pit's pottery contents too, of a coarse, utility ware was similar but, in addition, it contained one large piece of a cream fineware footed bowl, which is characteristic of local Middle Horizon pottery in the Cuzco Valley^{4a}. The 1987 extension of the excavation at the south side investigated an unusual sub-square surface structure. This structure appeared to face east, and utilised large stones in a post and fill-in technique. The excavation also located the southern edge of the court and included a complex area of walls of several building phases.

Although the final season of the Q2-2 excavations did not yield well-preserved remains of further complete forms for the architectural studies of the main occupation, difference in phases of building style were apparent and the site yielded a collection of pottery associated with these walls. It was possible to identify several phases of occupation including the Middle Horizon and the Late Intermediate periods. There may or may not be some discrepancy between the radiocarbon date and the Middle Horizon pottery. This was not resolved, but it is noted that a date

³ At first interpretation the form of this building was perceived to be approximately oval but on further consideration of site plans the term sub-rectangular seemed more appropriate.

⁴ Radiocarbon date for Q2-2, run at the Godwin Laboratory with Stuiver and Pearson 1986 calibration: Q-3091 1580BP \pm 60 (i.e. AD 420-545 65% probability; or AD 340-600 95% probability).

^{4a} Some evidence suggests this pottery may first appear in Lucre prior to AD 600 (Dwyer 1988 and Barreda, pers. comm.).

of c. AD 600 does allow these artifacts to be contemporaneous and the first occupation of the site predated these contexts. The terrace which sealed the site was probably built, according to the evidence of the pottery and a fragment of canal discovered, in two phases, the latter of these well into the Late Intermediate Period.

At Patallacta, which contains some Late Intermediate Period pottery in wall fill and in some disturbed superficial and levelling deposits, virtually no pre-Inca occupation features were revealed directly under the Inca occupation floors. Only one context of entirely pre-Inca type pottery was found, in the southwest corner of Sector III, containing artifacts (including Ware 45) of the Killke/Killke-related style. This Late Intermediate Period style of pottery was also found to predominate in the mound excavation outside, NE of the town, and is also incorporated in terrace fills and on surface areas below the site. These finds confirmed the Late Intermediate Period occupation here. It was not until the last day of the 1985 excavations, however, when a short trench, dug in A43, Sector II, to establish the relationship of the Inca occupation to the natural bedrock of the site, that remains of an even earlier occupation were found (Fig. 12). A fragment of wall, possibly built in the same style as that of the earliest wall at the hitherto unique (Q2-2) buried tableland site, was found underlying and in apparent association with a sherd of a local utility type probably of the Middle Horizon Period.

In 1987 this find was followed up at Patallacta by excavating the stratified levels below the Inca occupation, Sector II, in the patios A44, A45 and A40 with extensions into B49 and B41 (Plate 16). In all five areas excavated, the original natural river terrace was reached at a depth of no more than 1.30m. A Late Intermediate Period agricultural terrace was found to overlie a sealed deposit containing earlier material — tentatively dated to the Early Intermediate/Middle Horizon periods (Fig. 13; Plate 26). The site yielded a new type of pottery or possibly two types, which included fine-line, watery brown to black designs on cream and a light reddish-brown ware. Unfortunately very few decorated or diagnostic sherds were found. Some sherds closely resembling these new types were also found in the buried tableland site in 1987. This material and two fragmentary bits of straight narrow walling (visually very similar to the earliest wall found at the Q2-2 buried site) were the extent of the pre-Inca cultural finds of interest excavated in Sector II. Of additional interest to the environment studies, this site was situated on the old river terrace bed which is estimated by Stephen Carter to be about 10,000 years old.

It was also near the end of the project, in 1987, when excavations on A6, Q2-1, began to yield material that would enable us to set up the full sequence of occupations (Hey 1988). Under the Late Intermediate Period remains of the two circular structures several earlier phases of occupation were to be found in a highly complex site equal only to that of A22. Although this excavation together with A22 was found to provide the key for our stratigraphic sequence it was found that there was an overlap with the buried tableland site. This is therefore incorporated into the sequence for additional data on the Early Intermediate/Middle Horizon periods.

The Early Intermediate Period by Gill Hey

Until the 1987 excavation season evidence of Early Intermediate Period occupation activity had been slight. A small cemetery discovered in A22/B17/B20 (with 23 skeletons) was suspected to date to this period, as were traces of occupations superseding it. Other isolated pits and post-holes had been found. The removal of the earliest Late Intermediate Period structure on A6, with its terrace system, in 1987, however, uncovered a sequence of occupation deposits which were

unquestionably Early Intermediate Period in date. Successive episodes of terracing, house building and occupation were interspersed with a phase of burial which indicated a change of population. Despite these events the style of pottery found was remarkably homogeneous.

The A6 occupation, Q2-1 (Figs 14 and 15)

The earliest evidence of activity here was the construction of a terrace running N-S across the site. Residual finds in the terrace layers suggested that Early Horizon deposits had been removed from here or lay nearby. The remnants of a surface abutted the terrace wall but the nature of this phase of occupation was unclear.

The area was re-terraced into three levels retaining the same alignment. The central terrace, which was 4m wide, functioned as a house platform, on which several successive, small rectangular structures were built. The earliest structure, 2.30m x 2.20m in size, had probably had stone foundations on three sides with a less substantial wooden wall to the west. The traces of a structure overlay this building, of which only the wall slots survived, and these varied from 0.10m to 0.23m in width. The wall material is unknown.

A wooden building superseded this structure, which was 2.10m x 2m in size. It had wall slots approximately 0.12m wide, and several stake holes along the bottom of these slots suggested that the building had been made of upright wooden stakes set in shallow linear slots (Plate 17). A fence line lay to the north.

Three later structures, further south on the terrace, were associated with rubbish pits, gullies and isolated post and stake holes.

Traces of floors and charcoal layers overlay these buildings but this phase of occupation has been almost completely destroyed, either by exposure during a period of abandonment or by later activity.

The site was then used as a burial ground. Thirteen burials were found: 10 adults, 1 youth and 2 infants. One lay on the upper and one on the lower terrace, but otherwise they formed an interesting and contemporary group on the central terrace. The skeletons were buried upright and appeared to have been bound. None of the skeletons were complete and some bones showed signs of having rotted away at the ends. Bone decomposition of these skeletons was caused either by their having been deliberately exposed pre-burial or by their re-burial on a new site, possibly by a new population of inhabitants.

The burials were overlain by a new terrace which widened the central house platform. A building was constructed in the centre of the terrace. It had been badly disturbed to the south, but would probably have been circular or oval and it was most clearly defined by its compact floor surface. The wall material was uncertain but the use of adobe is suggested by the shallow, possible wall trenches to the north and east and overlying deposits of compact, adobe-like soil. Several post-holes survived to the south and west. Pits, post-holes and external surfaces were contemporary (Plates 18 & 19).

Remnants of later floor surfaces with associated small, square, stone hearths (Plate 20) represented the final Early Intermediate Period occupation. Evidence of this phase of occupation was very fragmentary, and the fact that it was overlain by occupation of a very different form associated with Late Intermediate Period ceramics, indicates that it was exposed during a long period of abandonment.

The A22/B17/B20 cemetery (Q2-1)

Early Horizon Period occupation in A22/B17/B20 was cut by a group of burials. The finds from the graves were mostly residual but as a group they seemed to post-date the Early Horizon Period. The burials could have been contemporary with the A6 occupation but it seems more likely that they were earlier (Plate 21).

Twenty-three burials were found: 18 adults and 5 infants. The majority of the skeletons were crouched with one crouched and upright in a pit and another crouched and lying on its back. One skeleton was an extended inhumation. Some burials found beneath B20 had been very badly disturbed.

A22/B17 occupation (Q2-1)

There is some evidence that the site was occupied after its use as a cemetery but before it underwent large-scale terracing in the Late Intermediate Period. Study of the ceramics supports the existence of a separate occupation horizon here which appears to be contemporary with that on A6. The traces of this occupation are slight, possibly because it was exposed during a period of abandonment of the site.

There was a building in the south of A22 which was defined by a good floor surface. Several small pits and post-holes were contemporary. To the north patches of floor surface and pits and post-holes survived.

Evidence for the existence of an Early Intermediate Period structure was found on the north edge of the B17 site. A destruction deposit of eroded adobe overlay the stone and adobe foundations of two walls of a structure which mostly lay to the north of the excavations. It appeared to be broadly contemporary with the A22 material. Backfill of occupation debris within a circular Early Horizon building immediately to the south was of the same date.

The Early Horizon Period by Gill Hey

The excavation evidence suggests that there was a farmstead on the A22/B17 site in the Early Horizon Period, which probably supported one extended family group. Evidence of two types of structure was found: a subcircular building terraced into a fairly steep slope with adobe walls, possibly on stone footings, and a structure of indeterminate shape (but probably also subcircular) which sat on a locally terraced site, probably also built of adobe. Hearths, rubbish pits, storage pits and post-holes were associated. The settlement had its own small cemetery.

The focus of occupation B17/A22/B20 (Q2-1) (Fig. 16)

A subcircular building was found associated with surfaces, occupation layers, hearths, pits and post-holes (Plate 22). These features may not all have been contemporary as it was not possible to relate all contexts stratigraphically. Thick deposits of stone and soil from Inca terracing had served to protect earlier levels at the west edge of the site but had destroyed deposits or at least disjointed the stratigraphy in the east. Terracing during the Late Intermediate Period and grave digging in the Early Intermediate Period had also taken its toll. They were, however, all part of the same occupation phase and all the ceramic finds were of the Early Horizon Period.

The building was terraced directly into a fairly steep slope, the cut being 0.65m deep at the back of the structure. It had been excavated away to the west during the Late Intermediate Period and to the south it was obscured by an Inca wall. However, it appeared to be subcircular in shape and about 3m in diameter with the entrance to the west.

No walls remained, though there were a few stones on the north edge. The presence in the backfill of the terrace cut of small lumps of adobe, and soils which could have been derived from adobe, strongly suggested that this was the wall material. Two successive floor surfaces of the structure survived. A sample of charcoal, excavated by Kendall in 1975, from the lower floor produced a radiocarbon date of 414 BC⁵.

Several external surfaces seemed to be related to the building, as did a short wall alignment, a small rectangular stone hearth, many pits and post-holes, burnt deposits and occupation layers.

Related Remains (Q2-1)

Evidence of pre-Inca occupation was found on A24 but it has not yet been dated. This site lay behind the occupation site and we might expect to find traces of contemporary activity. A compact surface could be related.

There were also traces of Early Horizon Period occupation on B2/A5 on the lowest Inca terrace, where several contexts were located. They must represent what was once a more extensively used site. The remnant of a floor surface was discovered below A5 and, to the west of it, below B2, was a large pit, the fill of which contained Chanapata-style pottery.

Some burials were found on B26: three burials were excavated. Two of the skeletons were of adults and one was a child. They were all crouched on their sides in fairly shallow pits and had different orientation. It seems reasonable to assume that they were contemporary. (A sample of bone from skeleton 6057 gave a radiocarbon date of 530 BC \pm 50 years (BM 2570)). The graves cut four pits.

The radiocarbon date and initial studies of the pottery suggest that these burials are broadly contemporary with the Early Horizon Period occupation. Like Early Horizon Period burials found elsewhere they were simple, crouched inhumations in shallow pits with no grave goods. (Bennett and Bird 1965; Rowe 1944 on burials at Chanapata; Grossman 1983 on Initial Period burials at Andahuaylas.)

The Finds and Chronology

Processing and treatment of finds, supervised by Sara Lunt, has led to the cataloguing of over 400,000 objects; these include pottery sherds, fragments of animal bone (some of them worked), human burials, obsidian flakes, used stones and carved lithics, metal objects, shells, pigment remnants, plaster and mud bricks. These have been described, identified and documented and lodged with the INC, Cuzco. Many have been analysed. A large number of provincial and some

⁵Radiocarbon date for Q2-1 from charcoal found in 1975, level 12: British Museum no. BM 1633R, revised calibrated result: BM-1633R 542 BC \pm 120 (i.e. 662-422 BC).

imported artifacts are present in each occupation, except in the case of the Middle Horizon, for which we have very limited evidence.

The excavation strategy has enabled us to retrieve a variety of pottery types dating from the different periods. Some of the disturbance in the upper levels and contamination from decomposition of walls containing cultural material has been offset by careful screening of contexts used for the chronology, diversification of the excavations over a variety of sites and Lunt's research to identify pottery by its fabric. We are confident of having sufficient control to refine the chronological data.

In studying the finds (Kendall 1983; Lunt 1984 and 1987), concentration first focused on identification of the composition of the materials used in manufacture. Pottery research included thin-sectioning, followed by petrographic and petrological analysis and scientific methods of analysis used to study the fabrics and pigments. Sara Lunt, the pottery specialist and Finds Supervisor, investigated how these could have been composed from locally available resources, by identifying local clays, pastes and tempers.

Distinguishing between locally made and imported pottery is particularly important in the Cusichaca valley where there appears to be a large proportion of regional as well as some imported styles. This approach is being used because the attempts of archaeologists to establish a chronology for Cuzco, often with insecure strata relationships and by means of seriation, have resulted in a great many uncertainties and generalisations. The chronological sequence of pottery types Lunt has documented for the Cusichaca area is detailed and contains new data, as well as evidence for some variations from the uncertain Cuzco sequence (Lunt 1987; Kendall and Lunt 1989). For instance, the Late Intermediate Period pottery workshop(s) which produced the style known as 'Killke' at Cuzco (and referred to in its local manifestation at Cusichaca as 'Killke-related'), appears to have continued in production locally during the Inca occupation, at least during Pachacutec's reign. In Cusichaca, because of the relatively late date for the start of Inca occupation, it has been a simpler task to obtain clear relationships between types of pottery and their association with architecture (Fig. 17, Chart A). It is quite clear for example that classic Inca pottery was produced and imported here before the end of the Late Intermediate Period and the arrival of the Inca occupation (see Lunt, below). In Cuzco there is still some confusion over the use of the term 'Killke' in relation to the 'Initial' or 'Early' Inca culture.

Late pre-Inca and Inca pottery by Sara Lunt (1987 and 1989)

The Cusichaca pottery has been classified using fabric (or paste) as the major discriminator between 'Wares'. The components of a fabric (the clay and tempering materials) can, in ideal circumstances, lead us to the place of origin of the raw materials, and thence to the provenance of the pots themselves. Although many of the Cusichaca wares were made from materials obtainable locally, a substantial quantity was not, and must have been imported to the Cusichaca sites.

By distinguishing temporal from regional variation in the Late Intermediate Period and Late Horizon pottery, we can discuss and identify the pre-Inca economic relations between Cusichaca and other areas. We can trace developments in styles and technologies of imported ceramics, and detect fluctuations in the ceramic trade, not only on an Imperial level, but on the lower levels of traditional local activity.

A period of intense mercantile activity (Phase C: before the main Inca occupation of the area), can be identified (Fig. 17, Chart A). The designs and motifs which decorate Wares 15, 28, 66 and Sample 155 (the new non-Inca imports) were widespread in the south Central Andes during the Late Intermediate Period, and these wares display no classic Inca influence in shape or design. This suggests that their production centres had been in existence before the formation of the imperial Inca state and the production of its highly influential pottery. The accessibility of these 'traditional' wares was, however, a new phenomenon in Cusichaca at this time; previously trade networks had been more restricted.

A difference to the north and south of Cuzco during the Late Intermediate Period has been identified in the distribution of 2 major wares: Ware 15 (Lucre) and Ware 45 (Killke). The Cusichaca evidence shows that trade in Ware 45 began before that of Ware 15, but that both were being imported before the end of the Late Intermediate Period and until the end of the occupation of Cusichaca.

Sites in Cuzco and in the immediate vicinity have produced substantial amounts of Ware 45 (Dwyer 1971; Gonzales 1984; Rowe 1944). The Ware is common in Kendall's surface collections from the Cusichaca and Urubamba valleys: in Piscaycucho, it outnumbers all other wares. In surface collections from Ollantaytambo, and in Gibaja's excavations (1984), it is virtually the only non-Inca fine Ware. In Cusichaca it was amongst the first of the Late Intermediate Period imports, and it forms about 10-12% of the total assemblage throughout the rest of the sequence.

In collections from the SE of Cuzco, Ware 45 is either absent or very rare. The major Late Intermediate style ware in the Lucre basin seems to be Ware 15; it is a common component in the Pacaritambo collections, and is fairly common in Bauer's surface collections from Paruro. NW of Cuzco, Ware 15 is absent everywhere except for the handful of sherds from Cusichaca, appearing first amongst a group of other new imports at the end of Phase C (Late Intermediate Period).

This suggests that the centre of production of Ware 45 was located in Cuzco or to the NW, that of Ware 15 to the SE, each production centre having had a restricted distribution network. Considering the ceramic evidence alone, it is possible to interpret the pattern in purely economic terms: an overlap in some SE collections suggest market forces alone could be responsible for the distribution pattern to the NW. However, the complete absence of Ware 45 in the SE is striking and suggests that other factors may have been in operation to restrict the trade network. In conjunction with Kendall's architectural evidence, which shows differences in architectural style in the Middle Horizon and contrasts in the Late Intermediate Period, it is clear that this north-south divide is of some significance.

Following the 1985 and 1987 excavation seasons, we can now see that from the Early Horizon Period onwards the main area of influence for the Cusichaca pottery lay to the SE. Many of the imported pots seem to have originated there; and their styles were shared by the local products. The first appearance of the classic Inca ceramic style provides a *terminus post quem* in the Cusichaca sequence. Interestingly, the first Inca import appears together with a provincial (non-local) copy of an Inca ware, and both are found in a context pre-dating the formal Inca occupation of the valley. Clearly, the ceramic products of the emerging Empire were traded beyond the Imperial frontiers.

In terms of presence or absence of imported wares, the Inca *occupation* would pass unnoticed. The assemblage remains the same from the latest pre-Inca phase to the last phase of occupation, with only rare new things appearing. Whatever trade networks were established before the Inca occupation, therefore, remained viable to the end of the Late Horizon Period.

Adding the ceramic evidence to the clear-cut architectural evidence, the Imperial frontiers break down a little; one is dealing here with a mundane sub-stratum of economic activity. The pottery of the Inca Empire in the provinces can be used to look at economic behaviour. But to recognise how pottery may have been used by the Inca administration as part of a non-economic strategy, and to see how such strategies affected consumers in the provinces, one needs comparison with the situation in the Inca capital or in a centre nearer Cuzco than Cusichaca.

The Early part of the pre-Inca Sequence of Occupations (Fig. 18, Plate 19, 23-29)

In 1989 Sara Lunt and Gill Hey made a revision of the pottery collections in relation to well-stratified contexts in order to finalise the early phases of the pottery sequence. The necessary data were provided by using well-sealed stratigraphic contexts from three excavations: A22 and A6 on the Huillca Raccay promontory site (Q2-1) and the buried site of the Huillca Raccay tableland (Q2-2). The following preliminary chronology is a summarised outline with some radiocarbon dates provided by the British Museum Research Laboratory, and more recently, the Godwin Laboratory, Cambridge⁶:

- *The first phase* (from A22) is represented by the earliest variety of Chanapata pottery, the same as that found in Cuzco and described by Rowe etc. No other types of pottery are associated with it in this phase (Plate 23).
- *The second phase* (from A22) is represented by a variation in the Chanapata pottery. It is similar to Chanapata but the paste is thicker and the finish less regular.
- *The third phase* (from A6) is represented by a continuation and two new types:
 - a. a type of pottery which continues is derived from Chanapata (Plate 24);
 - b. the Pacallamocco type/style pottery (known from Cuzco and its type site near Maras) with distinctive rounded rims;
 - c. a new type of pottery represented by a bowl with an incurving rim.

This phase continued through several occupation levels (at A6) of the Early Intermediate Period, in which the architecture varies considerably (see description of this excavation).

After phase three there is a discontinuity in (Q2-1). The next phase, which does not immediately succeed it, is identified at (Q2-2), where it post-dates the earliest wall and a small amount of Chanapata and Pacallamoco pottery. In this phase there are no parallels in finewares but there are similarities between the two coarseware assemblages in the utilitarian pottery types of the Chanapata-derived ware.

⁶ When all the samples have been processed the latter radiocarbon dates will be published fully in a forthcoming paper by Kendall and Switsur.

The fourth phase (from Q2-2) is represented by:

- a. utilitarian pottery, derived from Chanapata, which continues through three phases at this site and appears to be Huari utilitarian (comparison with McEwan's Huari utilitarian wares at Piquillacta) (Plate 25);
- b. bowls in red clay with incurving rims, fine straight walls and slightly burnt by carbon;
- c. a creamware (slightly rosy) with pale, watery black paint. A similar ware was apparently obtained by Dwyer at Minaspatha in 1985 from Early Intermediate Period contexts (personal communication) (Plate 26).

The radiocarbon date of AD 340-600⁷ was obtained from the antler horn, apparently associated with the fineware pottery. The main architectural remains including the sub-rectangular-oval structure, passages and walls surrounding the court must pre-date the antler horn or be contemporary with it.

Although the tableland sequence continues from this date the clearest archaeological sequence is again in the promontory site (Q2-1). It is taken up in A6. Here in the *fifth phase* a quartz-tempered fabric predominates. (A series of Late Intermediate Period phases B-J follow at both A6 and A22 with pottery (Plates 27-29) and with architecture associated (pottery already discussed in the section above by Lunt and described in detail by her in the forthcoming publication by Kendall and Lunt in the RMN, Lima)). See Charts A & B.

Other Finds

Generally the wider collection of artifacts is notable for its variety and varying quality, with utility items predominating over fine or prestigious items. In the Inca period some pieces of metal work and stone carving show hallmarks of local manufacture, but the majority of the prestigious items show the characteristics of the classic style. Few items of the pre-Inca occupations could be considered prestigious except the imported pottery, obsidian flakes and the occasional bead or shell ornament.

During nine seasons of archaeological excavations we found only 40 **metal objects**, 38 of them in Inca contexts or of Inca manufacture. Carlos Cano of the INC, Cuzco, followed his treatment and preservation of these objects with an analysis of their composition. The results of his study are not yet fully available but many objects appeared to be of bronze and may contain varying quantities of copper. Lead, silver, and some tin may be contained in the alloys. The Inca collection comes from Huillca Raccay fort and Patallacta. It includes *tupus* (Plate 30), plain *tumi*, breast ornaments/pendant, tweezers, needles; one *tupu* was heavy from its lead content and was therefore probably a matrix. A most interesting observation made by Carlos Cano was that there appeared to have been a thin skin of gold over some of the objects (bathed in gold?), of which only vestiges remained to be seen under the microscope (Lechtman 1974). Cano's analysis of five

⁷ See footnote 4.

needles and a pin (*tupu*) show a copper content of 95% with CO₃ 3% and Mn 1-2%. A small silver sequin with a hole in it was 25% silver and 40% copper. The only two metal finds which are probably pre-Inca were both found on the Huillca Raccay (Q2-1) site. These are a metal pin with a carved head possibly of 'Killke' or the local Late Intermediate Period style; and a small sequin with a hole in it found in Late Intermediate Period levels of A22. Gold, the metal associated with most prestige, is not known in the area today but might have been washed from the Urubamba river in pre-Hispanic times. Local silver and lead mines in the mid and upper valley regions could have provided some of the resources for local metal working, but there was no evidence for workshops in the contexts excavated, nor of any other craft workshop areas.

The **lithics** included carved ritual objects and stone implements, which were studied by Brian Bauer. About 650 lithics were found in all, including 40 categories of implements found on the Q2-1 site. These were made either by grinding and pecking or by chipping. Amongst the carved ritual lithics are konopas (Plate 31) and bowls, and some unusual carvings such as a group of 'a female and her litter' (unidentified animal, amphibian or bird) and miniatures. A more abstract style of carved planes and receptacles *in situ* on rocks is seen at Pulpituyoc and on the approach to Huayna Quente, below Machu Quente. Pestles and mortars, bowls and slabs for grinding and mashing food (Plate 22), and a range of lithic tools are made from stones selected locally: only a few andesite slabs may have been imported to Huayna Quente during the Inca period from further southeast. Otherwise a wide range of tools was made from casually selected stones found locally: slate for knives, river core stones for hammers, granite for mortar bowls, etc. (Plates 32 & 33). Obsidian artifacts were also found and a number of flakes/chips. Samples from early Inca contexts were submitted for provenance analysis. The five trace elements (Ba, Ce, Rb, Sr and Zr) compared closely with the Cuzco type source (Burger 1979; Burger and Asaro 1979).

The large **animal bone** collection has been documented and studied by Kevin Rielly and Percy Paz Flores. The osteological collection contains the expected range of local species represented in the different cultural complexes: alpacas, llamas, vicuna, two types of deer, guinea-pigs, a range of other rodents, pumas, dogs and birds. Although camelids have long since disappeared from the region, there is evidence to confirm their presence from the beginning of the occupation of Huillca Raccay in the Early Horizon. Herds of llama and alpaca must have been kept in the local puna (high altitude pastures) of the Salcantay and Sillque areas. There is also 17th and 18th century archival evidence on the presence of alpacas⁸. The emphasis of the studies has included identification of evidence of butchering techniques on the camelids. Study of the bone implements has extended to the identification of which bones and from what animals the bone material was selected for implements (Plate 34). (Paz 1983, 1985).

(For carbonised seeds and charcoal evidence see Environmental section).

⁸ Grazing suitable for camelids, including vicuna, was confirmed in the upper Cusichaca Valley by the botanist E. Carrillo in 1979 (internal report).

Archival Research

This study undertaken by the author was mainly carried out from 1978 to 1980. There follows a summary of the range of data acquired, and a discussion of data recently encountered in documents on the names 'Quente' and 'Pichu'.

Ethnohistorical sources—the accounts and chronicles of the Spanish conquest period—contain few direct references to the pre-Hispanic periods in the area beyond Ollantaytambo. Useful data collected were from the documentary sources contained in archives in Cuzco, mainly on the late 17th-19th centuries. The administrative records of Colonial and Republican period local haciendas, their organisation and socio-economy were to provide background information relevant to the rehabilitation of the local agricultural system of Quishuarpata and Huilca Raccay. In particular a wealth of data was found on the economics of the largest hacienda, Sillque (Kendall 1978; Glave and Remy 1983). This hacienda contained most of the lands of the Cusichaca Valley area and, at one time, Quente (Archivo Departamental del Cuzco).

This archival research highlighted the critical socio-economic conditions for the success of agriculture in the mid-Colonial period, as opposed to the down-turn in late Colonial and Republican times, which continued to the present. In order to achieve a high yield of maize, the prime crop, it required a higher proportion of manual work and capital investment than other crops. When wars and disease epidemics struck, production diminished. Other aspects of the hacienda production were also clarified in the documents, including animal husbandry, horticulture and dairy production figures.

Subsequent research and documents on Ollantaytambo provided material for the 16th-17th centuries (Temple 1950; Rostworowski 1970; Glave and Remy 1983). Aspects of Inca social organisation, population decline, and legalised land-ownership with the formation of the haciendas were investigated.

The property registry of Cuzco was used for following the local pattern of land ownership in the late 19th century and the early to mid-20th century. Conversations with senior locals such as Don Martin Escobedo were a valuable source of information on local activities in the first half of the 20th century. It was also possible to authenticate, tracing back through earlier documents to the 17th century, the names of many lands in the area. Mesccay, Huilca Raccay, Pampacahuana, Quesca, for example, date from at least early colonial times and probably before. Names of parts of the Urubamba valley—Quente, Picchu, Sillque, Choquellusca, Tanccac—date from at least the Inca period. Further early information on Quente came to light only recently (see below).

The discussion of the function of Machu Picchu and of Patallacta at Cusichaca is now helped by archival data which has recently come to light and which suggests that both sites formed part of Pachacutec Inca's private estate of Quentemarca (Rowe 1987). The ethnohistorical reference to the location of 'Pichu' above the bridge of Chaullay (Relacion de Diego Rodrigues 1565) and the identification of 'Quinte Marca' and other lands along the Urubamba River in archival sources (Glave and Remy 1983), shows that these lands belonged to the Inca Yupanque (i.e. Pachacutec Inca, Rowe 1987). It is probable that the area of Hacienda Quente (from Patallacta/River Cusichaca to Machu Picchu/River Aobamba at the south side of the Urubamba river represented Pachacutec Inca's estate of 'Quinte Marca'. Within the property area were also located the Cedrobamba sites and the 'Inca Trail'. If we accept that all of this hacienda corresponds to the

estate of Pachacutec Inca, inherited by his *panaca* (descendants), which originally offered facilities for leisure, ceremonials and the support of a large extended family, (with its produce used for entertaining here and in Cuzco), we have a fine example of the variety of resources and facilities enjoyed by the first Inca Emperor.

Ethnography

This research described in the previous report (Kendall 1983), was aimed at helping to identify ancient activity areas (indoors and in patios), their furniture and function. Ethnographic research of the region's houses and their contents was started in 1977. This was extended in 1981 by Felicity Nock (1982). In the previous article the investigation of trodden earth floors and their wear in modern houses was included as well as pottery production distribution and the re-utilisation of pre-Inca pottery in a household. Ethnographic investigation also extended to local pottery clays and involved an experimental firing (see also Lunt 1987).

Ethnographic investigation of agricultural practices was carried out in relation to Agricultural Rehabilitation aims and land-use research.

Agricultural implements utilised include both Andean and Spanish Colonial types, ideally suited to terrace cultivation and ploughing requirements. It was observed that modern equipment and tractors, employed only by large, relatively rich property owners (only two families in the Cusichaca area) are unsuitable and cause damage to the pre-Hispanic infrastructure of terraces and canals.

Environmental Research

Archaeobotanical Research

In the first stage of the project ecological studies were carried out throughout the valley drainage and resulted in its subdivision into a variety of niches and a vertical agro-ecological system (Farrington 1979a).

Following this the scientific methods used to investigate ancient environmental conditions and resources can be sub-divided as follows:

1. Botanical, ethnobotanical and ethnographic studies;
2. Flotation and identification of seed, carbon fragments and samples from excavated soils;
3. Phosphate analysis of excavated site and agricultural soils;
4. Phytolith analysis of ancient terraced and cultivated soils;
5. Study of pollen from a glacial deposit.

1. About 200 plants were collected and recorded, and information provided by local people showed their use in a wide range of functions, including constructional material, tools, household

implements, culinary and medicinal herbs, soaps and insecticides, (Barnes 1978; Gil 1979; Armstrong 1982). Careful consideration of recent and present day uses can assist interpretation of the plant presence revealed in evidence provided by seeds and carbon samples found in the archaeological remains.

2. A relatively small amount of carbon and seeds has been recovered using manual and mechanical sieving processes. In order to make analysis and interpretation possible, a reference collection of carbonised samples was compiled from available Andean woods and local seeds. Comparative studies of these and ancient samples were made at the University in Cuzco, UNSAAC by Judy Stokes and Natalia Lara (1982). Firewoods and woods in use in pre-Hispanic times were identified from the excavated charcoal. Holden completed identification of samples from early contexts and assessed the potential of this subject in his report (Holden 1987).

3. Phosphate analysis was undertaken on 2000 soil samples taken from the fort of Huillca Raccay (and others from Patallacta) to identify concentrations of organic material. The results showed some areas of high concentration, but the high proportion of indigenous phosphate together with contamination by burning for clearance purposes, meant that more detailed interpretation was difficult (Davies 1983).

4. Samples of soil taken from pre-Inca and Inca terraces and cultivated surfaces were examined by Natalia Lara for phytolith presence especially in pasture land and cultivated soils. A proper evaluation of this study would benefit from the formation of a comparative scale put together using a reference collection of identified cultivated lands for which there is information of recent usage. It was hoped that phytolith identification would enable us to find out which types of crops were grown on the terrace systems and high slope field systems. Buried soils are crucial for the success of this approach since the terraced soils contain a mixture of soils cultivated in preceding periods. The discovery of ancient soils found buried beneath Pulpituyoc, the Huillca Raccay terrace system and Patallacta could have been of interest to this study, but it was abandoned due to lack of sufficient resources and facilities as well as the limited number of suitable contexts.

5. No pollen was found in the archaeological deposits.

Agricultural systems — land use research (Map 3)

Environmental research was extended from soils and vegetation to include studies of terrace structures (Keeley 1984), high slope field systems, and canals (Farrington 1979b, 1980a).

The soil and terrace studies show that 'artificial' soils were used in the two types of Inca terrace (those using natural support walls and those totally constructed). Excavation cuts on the Huillca Raccay tableland have provided evidence of modification and rehabilitation of some of the pre-Inca terrace walls. A study of the canal systems shows that the Late Intermediate Period canals too were rehabilitated and consolidated in pre-Hispanic times, and that the pre-Inca inhabitants of the region, like the Inca, were masters in engineering (Farrington 1980). The preservation of large parts of these systems confirms that they are a good solution for soil conservation on areas

of low to high slope gradients.

The high slope field systems, with horizontal banks cut and compacted by use as paths of access between fields, are also extensive and of some agricultural importance. These were found to be difficult to date except by association with the nearest sites. Work on the field systems, with documentation backed up by photographic record and complemented by current ethnographic and associated research, was extended to all parts of the drainage system (Marshall 1980; Kendall 1984). The two main reasons for cultivation of the fields today seem to be either private ownership of, or excessive pressure on, the more accessible land, and a desire to broaden the crop range grown in the lower valley to include hardy root crops traditionally grown in the upper valley.

All the agricultural systems, including the high slope fields, offer appropriate solutions for soil conservation in mountain environments and, when restored to full use, will form the ideal basis for future sustainable agriculture. (See end of section on Exploration and Reconnaissance for wider area cultivation figures.)

Agricultural Rehabilitation —Canal Restoration (Map 3)

Some late pre-Hispanic irrigation canals were still in use and traditional forms of labour are still practised in their maintenance. The surviving canals include the Late Intermediate Period canal off the Huallancay to Trancapata and the Late Horizon Period canals of Cusichaca, Misccay and Huayllabamba.

The technology of irrigation canals utilising local stone materials set in mud mortar and clay is still the best solution for long-lasting water channels. These must withstand high gradients, soil slip and earthquakes, as well as a rainy season and occasional misuse. The use of cement, viewed locally as a magic material in all building works, does not withstand wear and tear in such an environment.

The social organisation locally was weak, without strong leadership able to mobilise people in traditional forms of communal and reciprocal labour for carrying out community projects (Villafuerte and Saico 1980). This was why local people at Cusichaca had been reluctant to find the time to improve the efficiency of their systems — unless strong leadership encouraged them, clarified the incentives and provided back-up support. The project was approached first to help organise remedial building works on the existing canals. The material usually employed by the locals for repairing fallen sections was wood, which served only for short-term solutions. The use of stone required more organisation, technical expertise and teamwork.

The restoration work began in 1977 with a trial consolidation of three fallen sections of the Cusichaca canal at Quente with local people (Plate 35). It continued to function until, ten years later, the hacienda owner obtained government funds to completely restore this canal. This programme was the result of the success of our pilot scheme to restore the full length of the Quishuarpata canal 1978-1982/3. In 1983, at the close of our programme, we had successfully repaired and consolidated four local pre-Hispanic canals and restored 7km of the Quishuarpata canal (Plate 36) together with its distribution system. Four hectares of Late Intermediate Period agricultural terraces were brought under irrigation and cultivated at Quishuarpata in 1982. In all 45 hectares of ancient agricultural terraces were brought under potential year-round irrigation by September 1983.

The programme to investigate and implement rehabilitation of the prehistoric Quishuarpata

canal and its terraces was started by the Project with financial backing from the ODA (Overseas Development Administration) in 1978, as an integral part of the Research. The irrigation systems were investigated by Ian Farrington (1978-80), and subsequent to topographical surveys excavations were carried out to clear banks and permit the identification of concealed terraces. A summary of this work and the identification in 1982 of a distribution network originating in the Late Intermediate Period on Huillca Raccay tableland are contained in Kendall, 1983. These and other feasibility studies preceded the agricultural rehabilitation programme and its restoration of the Quishuarpata irrigation system.

The large-scale rehabilitation work on the abandoned Quishuarpata canal was carried out in four stages by local community members with INC participation:

1. The first stage which consisted of investigation, of the soils, canal remains and water sources, confirmed the technical feasibility of the scheme. Anthropological and sociological surveys also suggested that the plan could be a positive contribution to the economic development of the region.
2. The second stage, to implement rehabilitation of the canal and terraces of Quishuarpata (some 10ha of land), was completed in 1981 (after several critical sections of the canal were cleared and investigated as part of the hydraulic survey by Farrington (1980) and Binnie and Partners (Green 1978; Becerra 1980)). This and the third stage were supervised by the irrigation engineer Kees Stam and agronomist Guido Huaman, with the additional help of the mastermason Ignacio Aragon.
3. The third stage was the continuation of the consolidation/restoration to the tableland of Huillca Raccay and its 35ha in 1982. The canal brought irrigation water to the tableland for the September inauguration (Kendall 1982).
4. A further stage to develop the pilot scheme back from its original first intake off the Huallancay River was completed in 1983. This time a local foreman, Pablo Ccorahua, led the local workers and co-ordinated with the INC in the cleaning and restoration of the canal. The canal became fully operational in October 1983 (Plate 36).

Subsequently a small-scale community development programme was elaborated with the help of KAYRA, UNSAAC. This was initiated as the 'Proyecto Desarrollo Andino: Cusichaca'. Research agronomists Oscar Blanco G. and Wilfredo Salas (Co-ordinator) gave their support to local interests and Andres Peña, the agricultural resident, executed the programme of support with the 'Comité de producción de Huillca Raccay', formed by local people.

The objectives were as follows: to set up a blacksmithy for the eight communities in the area; to institute a rotative seed bank (capital and seed input); to develop community infrastructure (support for the newly formed Medical Post and its paramedics trained by the project doctor Luise Parsons, and for the school); and to maintain the irrigation canals.

These objectives were achieved 1985-87. A rotative seed capital of native crops (potatoes, tarwi, quinoa and kiwicha) was distributed/sown on the tableland. In the first year the capital

trebled and was used to extend the programme. However, the second year animal interference and transport problems exporting the surplus proved to be limiting factors. Tools for a blacksmithy were donated and temporarily installed in a room beside the school (Plate 37). Trips to other projects and to Cuzco for familiarisation with government agencies and other organisations were arranged for community representatives (Peña 1985-87).

Questions regarding soils, destruction of the floral environment and animal husbandry were taken up only late in the project with less successful advancement. These will have to be addressed in the future when, in addition to exploiting the natural resources, there may be more local interest in conserving the environment⁹.

In summary, we found that many aspects of the canal restoration project and its documentation were complementary to the archaeological investigation, as were accompanying investigations of the terraces, banks and distribution systems.

Reconnaissance and Exploration

Reconnaissance under the supervision of the author and David Drew from 1979 added new data each year on the pre-Hispanic and modern occupation and communication systems of the area considered to be within and on the fringe of interaction with the Cusichaca drainage.

The early stage of work concentrated on the immediate area of the valley itself with preliminary investigation of adjacent valleys and connections via the passes around Mount Salcantay with Limatambo and Mollepata. An examination of three principal roads and further intervalley networks with their associated sites showed that each system was planned for a specific function (Kendall 1988) (Map 1).

A summary of the extension of the reconnaissance work on late periods beyond the range of Machu Picchu is contained in Kendall (1979, 1983, 1984) and in Drew (Vilcabamba 1982, Santa Teresa 1984). The Patacancha valley, investigated since 1982, has provided the closest geographical and cultural parallel to the evidence of Cusichaca. The settlement pattern has a comparably high concentration of population and there is evidence for extensive land-use infrastructure in the late periods. Since the Patacancha valley area is currently (since 1987) under study in the Trust's new project these data will be published separately.

Strikingly different in settlement pattern are the long narrow Sillque and Santa Teresa valleys respectively east of Cusichaca and west of Machu Picchu, which have little evidence of classic Inca occupation. Here settlement was concentrated at the top and bottom of the valleys with extensive terrace systems around the confluence areas. The late occupation of the Santa Teresa valley shows continuation of Late Intermediate Period traits of building with some Inca influence and the presence of classic Inca pottery—but sites are not Inca built (Drew 1984) and there are no large Inca terrace systems. Local pottery types include utility wares with a different paste indicating a production centre here different from the one in the heartland Vilcabamba area.

⁹ In the Patacancha Valley project we have, since 1990, concentrated 95% of the Cusichaca Trust budget on rural development projects.

Occupation patterns in such valleys differ from those at Cusichaca because they were less economically attractive for Inca settlement and therefore played more marginal roles in their Inca organisation.

Roads (Map 1)

The major civic and economic route is identified at the north side of the Urubamba (Vilcanota) valley with branches via passes to adjacent jungle regions. The second, south bank route, which linked lands and sites between Ollantaytambo and Machu Picchu, was the main local economic artery, with extensions through the tributary valleys to the Cordillera. It connects through the Cusichaca valley with the higher roads, and to Limatambo and Mollepata. This road, which continued to Machu Picchu, may have functioned in its lower, later section as a prestigious approach to that site. The Cuzco - Huarcocondo - Machu Picchu mountain route with local branches provided a direct route to Machu Picchu. The direct mountain road via Salcantay to Vilcabamba was built primarily for efficient state communications and as part of a wider military strategy. The area is remarkable for the number of well-built interconnecting routes provided for local communications.

Each of the main roads described had quite distinct roles to play in the Inca organisation of the region. Some were built in sections in at least two phases, and in some cases, three phases. In the north bank major civic and economic route the first stage is now the least well-defined: the sites are not homogeneous but appear to have been built according to current needs, starting from the latter part of the Late Intermediate Period. During this transitional period, before the architectural style was fully evolved, some Cuzco-Inca influence or occupation may have reached Piscaycucho and possibly Choquellusca (Sarmiento 1572). During Pachacutec's reign, after AD 1440, the area was developed to Cusichaca/Corihuayrachina and to Machu Picchu in the full classic Imperial style of the Inca expansion from the Cuzco area. The secondary major economic route must have been built at the same time.

Pachacutec's initial policy almost certainly would have been to consolidate all those regions near Cuzco that had a concentration of *non*-Inca populations as well as securing his frontiers, particularly along the Apurimac valley, against another Chanca attack. The Urubamba valley with its links to the Apurimac drainage and the high *non*-Inca populations settled on the sides of the valleys, would have been a priority for this type of military consolidation. Marcapirí, Salapunco and Huillca Raccay would have been strategically placed to control and oversee the area, the latter controlling the Cusichaca connection with the Apurimac. The monumental remains at Salapunco appear to have fulfilled the additional function of a political boundary mark between the old area of influence and the new Empire. Three high lookout sites at Salapunco, Sora and Viscachaccasa would have overseen the Cusichaca connection with the mountain routes.

In summary, the main Vilcanota/Urubamba valley roads would have had to facilitate the movement of military and civilian population and the redistribution of goods, crops and materials to Cuzco. These roads seem to have been successful in linking concentrated vertical agro-ecological systems in the side valleys, connecting the Cuzco highlands to the jungle, and in the supervision of traffic through what was a well-populated region. The north bank valley road provided direct access to routes through the Patacancha valley to Amparaes and Occobamba and via the Panticalla (now called Malaga) pass to Amaybamba, Choquechaca, the bridge to

Vilcabamba, and other networks. For this reason it may originally have been used more than the south bank road which, except in its first section, had few defined stops until it reached Cusichaca and the approaches to Machu Picchu where bridge points provided connections with the north bank road.

Site relationships and wider patterns

The settlement patterns of the Cusichaca valley and its environs have been covered (Kendall 1984, 1988). Key Inca sites with well-preserved architectural features, which can be evaluated from their relationship to either Cusichaca or Machu Picchu, are Paucarcancha, Huayna Quente and Torontoy, all of which have features that fall within the range of Machu Picchu sites. Torontoy, overlooking the Urubamba river 8km beyond the Cusichaca confluence, was planned more in line with the Machu Picchu complex, which perhaps also explains its prestigious features. Huayna Quente, the features of which are most compatible with those of Huayna Picchu's temple, could have been built like that site after the completion of the first phase of construction at Machu Picchu. This small ceremonial centre would have added more prestige to Patallacta and its well-organised population, and served as another adornment on the approach to Machu Picchu.

The ceremonial nature of Machu Picchu should also be viewed in relation to the area as a whole. The number of ceremonial complexes on the Urubamba route to Machu Picchu suggests an approach to a place of pilgrimage with restricted, carefully controlled access. Certain preparations of a ritual nature, such as confession and cleansing, may have been necessary before the final ascent to the citadel. In another view the prominent position of the site may also have intended to draw attention to the Inca conquests of Vilcabamba and adjacent jungle area, in which case Machu Picchu could also symbolise Inca domination. The topography of the general area is not conducive to large scale administrative and religious centres combined in a single provincial capital nor any other type of centre, and in this area these functions were evidently maintained quite separately at Patallacta and Machu Picchu.

The Urubamba valley, in addition to its strategic importance linking areas, was of major economic importance to the Inca and their predecessors. The region as a whole, from the confluence of the Anta river, was administered in Inca times from the important town and fort of Ollantaytambo. Parts of the region may have continued to be worked largely by non-Inca populations, possibly including the ethnic groups which were part of an Ayarmaca Federation: the Chilliscache and Tambo (Map 4), but the Inca rulers and their descendants implanted groups of *Yanacona* (a high ranking servant class), and *mitimae* (colonists), who occupied the numerous Inca sites in the area.

The Cusichaca river probably divided Pachacutec's estate of Quentemarca from other lands. The well-built site of Patallacta and many other classic sites probably represent an occupation implanted by Pachacutec himself to the west of the confluence. While the eastern side could have remained in the hands of the state, the non-Inca population may still have been allowed the higher slopes and tablelands with pre-Inca terracing systems for cultivation (Map 3).

In addition to the localised land-use/cultivation figures obtained for the Cusichaca area, wider reconnaissance work along the Urubamba drainage provides figures for the late pre-Hispanic period systems between Pachar and Torontoy (north bank), and Pacamayo (south bank), (Map 2).

These figures provide totals for the land annually under cultivation in the entire district: 2486 hectares cultivated under irrigation (with the option for two annual crops), and 3202 hectares of high slope field systems (cultivated under a fallow system). The total area annually under cultivation can be expressed as follows:

$$\begin{array}{rcl} 2486 \text{ h (x2)} & = & 4972 \text{ h} \\ 3202 \text{ h (-70\%)} & = & \underline{961 \text{ h}} \\ & = & 5933 \text{ h} \end{array}$$

Maximum potential : $5933 \text{ h} \times 3 \text{ topos} \times 6 \text{ people (1 family per topo)} = 106,794$, the maximum number of people who could be supported by the maximum potential production from well-defined cultivated land systems (Kendall 1991).

Conclusion

This report summarises the progress of the various aspects of fieldwork in which the Project was engaged over eleven years. The account has included some discussion of how objectives of the Project were realised.

Documentation of environmental conditions and resources together with the evidence for both Late Horizon (Inca) and Late Intermediate periods of occupation (with their associated terrace and canal systems) confirmed that the area was one of intensive occupation and cultivation during both periods, with the Inca centralising and improving earlier agricultural systems. Although the basic requirements of food, water supplies and security remained the same, different strategies were adopted to obtain these essentials: the Inca concentrated their population in lower sites for maize cultivation; the late pre-Incas concentrated in mid-valley, defensive sites, suggesting preference for a more localised, widely ranging agricultural strategy.

One of the more important results to come out of the area study is to show that the Killke series, equated by Rowe (1944) to the Early Inca (as early as c. 1250-1428) should not necessarily be assumed to be evidence of the Early *Inca* expansion. On the contrary, the evidence of contrasting architectural styles SE and NW of Cuzco and the differentiated distribution of Killke wares, suggests that it could have been the Ayarmaca who extended their influence during the Late Intermediate Period to the NW and Cusichaca in particular. The Early Inca, too, may have had a limited area and phase of expansion towards the end of the Late Intermediate Period but it is significant that there is little or no evidence of an Inca *occupation* pre-dating the Imperial expansion from Cuzco at the beginning of the Late Horizon, only of trade. The evidence from the range of major sites and some minor sites in the Cusichaca and Huallancay drainages shows no associations of classic Cuzco-Inca pottery with a proto-classic style of Inca architecture in between the Ayarmaca Federation and Imperial Inca expansion.

The quantity and range of Inca pottery types is very similar at most of the sites excavated but each assemblage has some differences of emphasis. The differences are probably not enough to make a real success of further defining activity areas already interpreted broadly in the

architectural studies, but they are more positive for defining differences in social status. Pre-Inca occupation in terms of pottery and finds shows continuity and close relations with the Cuzco area during most of the sequence. However, it is now confirmed that the Middle Horizon is not represented by a classic Huari occupation at Huillca Raccay.

While the early pottery changes little, showing only the one main discontinuity at the end of the Early Intermediate Period, the architecture shows many changes of style. In addition, after the Early Intermediate Period and through the Late Intermediate Period, the architectural styles differ markedly from those known in Cuzco (Kendall 1976b), while the pottery of the two areas remains comparable (Fig. 18, Chart B). The meaning of these differences, with emphasis on the Late Intermediate Period, is considered in a forthcoming paper (Kendall and Lunt 1989; Fig. 17, Chart A, and Map 4).

In the last two seasons of the project the Early Intermediate Period was identified for the first time in this part of Peru, several phases of the period of occupation being isolated during excavation. As posited in the 1983 interim report, at the beginning of the Early Intermediate Period there is a considerable overlap in traits with the Early Horizon — in pottery and architecture — followed by new developments impacting on the area. When all the radiocarbon samples have been run we hope to be able to date these finds more closely within the Early Intermediate Period and show cultural changes documented with considerable detail.

Southeast of Cuzco, excavations at Minaspata by Dwyer in 1983 and at Huaro by Beijer and Zapata in 1988-9 have recently identified early deposits with Early Intermediate occupations. Dwyer (pers. comm. 1987 and 1988) considered his Early Intermediate Period material to be closely similar to the Qotacalle style (Barreda 1970), and our material to include parallels. Zapata's finds, which we saw in 1989 were considered by Lunt to include some examples of Early Intermediate types of pottery. These showed that some cultural continuity from the Early Horizon was also experienced southeast of Cuzco.

It was possible to date the duration of the Early Horizon occupation by choosing suitable samples from the beginning and end of the occupation. The bone samples from a spread of the flexed burials gave radiocarbon dates outlining a burial or cemetery phase in A22 and adjacent promontory areas of Q2-1 starting c. 760BC to 360 BC¹⁰.

The excavation programme first concentrated on one multi-period site, then diversified to various other sites of the Inca complex and of the Late Intermediate Period and their accompanying canal and terrace systems. It finally intensified investigation of the lower strata of key sites to obtain a sequence of local occupations, c. 800 BC - AD 1534 with only one break (partial discontinuity between phases 3 and 4). Detailed excavation reports have been prepared annually by the excavation supervisors (see Acknowledgements and Bibliography). Only the essence of the results are presented here.

The pottery sequence has been established and forms the basis of a chronology for the area, the most complete series for the Department of Cuzco in terms of its establishment on one site (three excavations with virtually overlapping occupations all on Huillca Raccay (Q2-1 and Q2-2). A pottery type- series has been prepared for the Instituto Nacional de Cultura, Cuzco, to be used as a reference collection by local archaeologists. This is accompanied by a detailed text

¹⁰ Radiocarbon dates for Q2-1 run at the British Museum Research Laboratory with Stuiver and Pearson 1986 calibration: BM-2569 400-380 BC cal.; BM-2570 790-750 BC or 700-535 BC cal.

prepared by Lunt describing each type in the series, and providing the results of her scientific analysis on its make-up¹¹.

All the archaeological data from the excavations and finds have been processed, analysed and recorded to the required standard (Level IV/standard DOE, October 1975 Regulation). This information is available in a series of reports prepared for the Project and INC (4 copies of each volume), of some 50 volumes covering all aspects of the projects, 1977 - 1988.

A wealth of data has been amassed towards the overall aim of gaining a well-illustrated view of the origins, development and functioning of a pre-Hispanic rural system. This forms not only the basis for some results with broad implications for Cusichaca but will provide a basis for future investigations and new hypotheses to be tested in other projects, such as our current Patacancha Project based on Ollantaytambo.

Reconnaissance trips have added new data to knowledge of the pre-Hispanic occupation and communications systems of the area. New Inca and pre-Inca sites were registered between 1977 and 1985, bringing the total of known sites to 90 in the Cusichaca drainage area and 200 including the surrounding areas subjected to our reconnaissance work. An extensive variety of valley and intermontane communication routes permits a reappraisal of the relationship between Cusichaca, Ollantaytambo, and Machu Picchu, (Kendall 1988, and forthcoming in Spanish) and a wider evaluation of the area of study in pre-Hispanic times (Lunt 1989). Ollantaytambo and its valley (the Patacancha) was found to be the only closely comparable valley system to the Cusichaca and its confluence area. The town of the former, however, is a significantly more prestigious complex occupied by the nobles from Cuzco (Glave and Remy 1983), in the light of which Patallacta can only be interpreted as a somewhat lower status residential area built as part of a practically oriented development, occupied by dependents or subjects of the Inca.

The data collected help in defining the interaction of Cusichaca populations with other areas as well as the nature of the road systems and stages of the Inca domination and development of the area. The hypothesis that Patallacta and Machu Picchu were part of the estate of Pachacutec Inca is compatible with the proposition that the Patallacta/Quentemarca development was the economic basis for Machu Picchu. This substantial personal property development as early as this reign would support the view that dramatic social and state changes took place during the Inca period, at the beginning of the Late Horizon, transforming the traditional reciprocal exchange values characteristic of Late Intermediate Period highland Andean society. Previously it has been thought that such changes were more apparent in the later reigns, although Rostworowski (1988) considered them to occur with the formation of the Inca government by Pachacutec over adjacent areas after the 'Chanca War' (Betanzos 1551 v-x, Sarmiento 1572 xxvi-xxxvi etc.).

The question of relating late pre-Inca ethnic groups to the archaeological evidence was tackled by Kendall in Kendall and Lunt (1989). There is no ethnohistoric data linking pre-Inca groups directly with Cusichaca or Quente. The *Chilliscachi* in Socma and Huata (Anta valley) and the *Tambo* (in Ollantaytambo) are the most clearly documented groups nearest to the Cusichaca valley. These groups almost certainly belonged to the Ayarmaca federation, whose capital may originally have been in Cuzco but was in the Maras area during the rise of the Inca (Rostworowski 1970). After the 'Chanca War' the Ayarmaca were finally broken, as were the Chillischachi and

¹¹ A copy for the British Museum is in preparation.

Tambo during the 'Transition Period' at the end of the Late Intermediate Period, when Pachacutec Inca is said finally to have defeated neighbouring groups and forged them into the Inca state (Map 4). The predominance of Ware 45 and certain regional types of the Killke pottery style in the Late Intermediate Period, combined with circular forms of buildings, supports the hypothesis that these were the artifacts associated with the Ayarmaca and related ethnic groups northwest of Cuzco.

The question of some penetration of the study area from the north-west across the Apurimac by the *Quechua* and even the *Chanca* ethnic groups may in the future become further clarified; the architectural evidence does not exclude this possibility. However the pottery evidence is clear of strong cultural ties and interaction with the Cuzco and Maras regions.

In an ideal region for maize, such as Cusichaca, it is not surprising that the evidence suggests there must have been an almost continuous spiral of agricultural development and growth in maize production areas, with, in turn, considerable increases in population, at least from c. AD 900. It is surprising that, as yet, evidence for Middle Horizon activity here is so slight. The decline in the 16th century, and subsequently from the mid-18th century, was due to reductions of population followed by diminished organisation and maize values. However, the period of a successful hacienda system run by wealthy landowners and religious bodies in the late 17th and early 18th centuries illustrates what a homogeneous administration could achieve¹². A controlling administrative group is essential, which invests or provides for a subsidy of the work costs directly in cash or indirectly in work implements, food and redistribution costs.

The results of investigation of land-use illustrate the potential of the local pre-Hispanic technology for solving problems of sustainable agriculture. Surpluses of up to 90% could have been obtained, enabling the feeding of as many as 100,000 people from the state supported classes (or others) outside the province of Ollantaytambo. Such figures have important implications for the future of this area, especially if the pre-Hispanic infrastructure can be restored to something like its original full potential.

To this end our studies into these outstanding works of pre-Hispanic rural development formed the basis of a practical pilot rehabilitation scheme. The successful rehabilitation of the Quishuarpata and Huilca Raccay tablelands, bringing them under permanent crop production, provides a basis for optimism among communities who embark on future rehabilitation and conservation schemes.

The approach is widely applicable to rural development both along the Urubamba Valley and in other areas where pre-Hispanic infrastructure counteracted soil erosion and provided permanent irrigation. The Peruvian government has recognised the economic importance of the past systems and since 1983 has begun to focus efforts on restoring this heritage in certain areas. Tourism and rural development can work side by side but a drastic worsening of the local economy has limited progress in this direction. It can be seen that the Incas spared no manpower expense in reclaiming valley floors from meandering rivers and hillsides from erosion. The cost of restoring existing systems is quite small in relation to the building of new ones with

¹² The records of the Bethlehemites and research by Glave and Remy illustrate a period of relative stability and expansion under the administrative organisation of the hacienda system by religious bodies in the first half of the 18th century. (The degree of exploitation of the local population is however a factor on the negative side.)

inappropriate materials. The manual work-force required could be organised using traditional labour mechanisms, which while still in existence need restimulating.

The depressed state of the Cusichaca area rural economy encountered in 1977 was certainly alleviated by the impact of the Project's development programme. Over ten years our input into restoration of the irrigation canals, establishing a medical post, supporting the school and finally providing a rotating capital for agricultural improvements, helped create a more outward-looking, positive approach to the local community¹³. The INC helped to stimulate interest in the area, improving tourist access and restoring the major Inca remains of the area.

At the time of its formulation in 1976/77 I had hoped to be able to carry out a project which we could not only justify on an academic level, but which would also contribute to the rural development of the area. In this I believe we have had some success. We have perhaps opened the way for more archaeological projects to gain greater intellectual understanding from involvement with the communities amongst which they work, and to contribute where appropriate to local interests and to the future¹⁴.

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¹³ In 1990 a visit confirmed that cultivation has now extended to the whole area of the tableland, animals are now controlled and barred from the terraces by corral walls, and the irrigation system is being maintained and extended by the community. Their community is now also interested in conserving natural resources and making other improvements.

¹⁴ See footnote 9.

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Abbreviations

- AAA American Anthropological Association
- BAR British Archaeological Reports
- RMN Revista del Museo Nacional - Peru
- CAP Cusichaca Archaeological Project (Unpublished)
- CP Cusichaca Project (Bulletins)
- ICA International Congress of Americanists
- IEP Instituto de Estudios Peruanos
- INC Instituto Nacional de Cultura
- UNSAAC Universidad San Antonio Abad de Cusco

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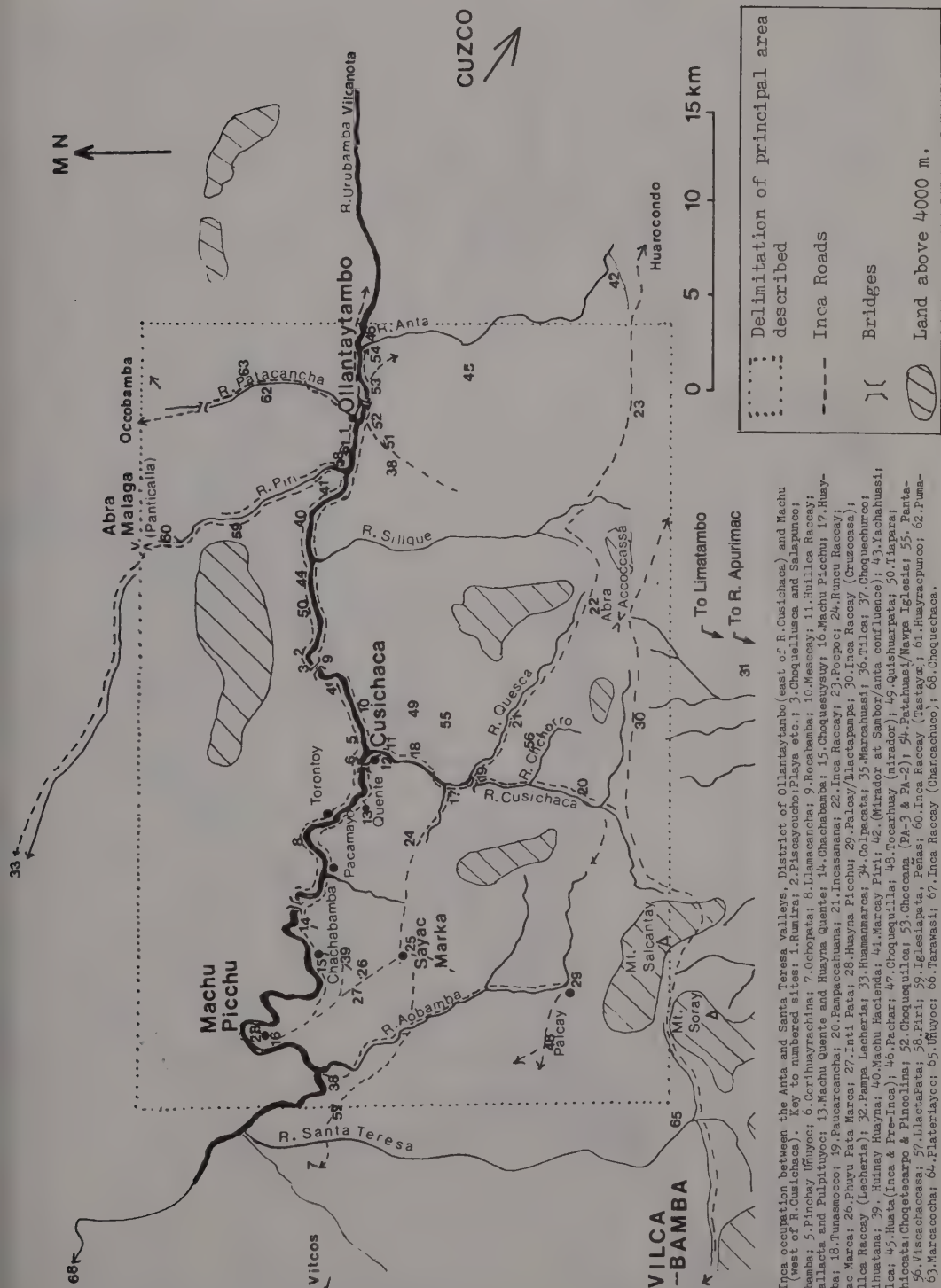
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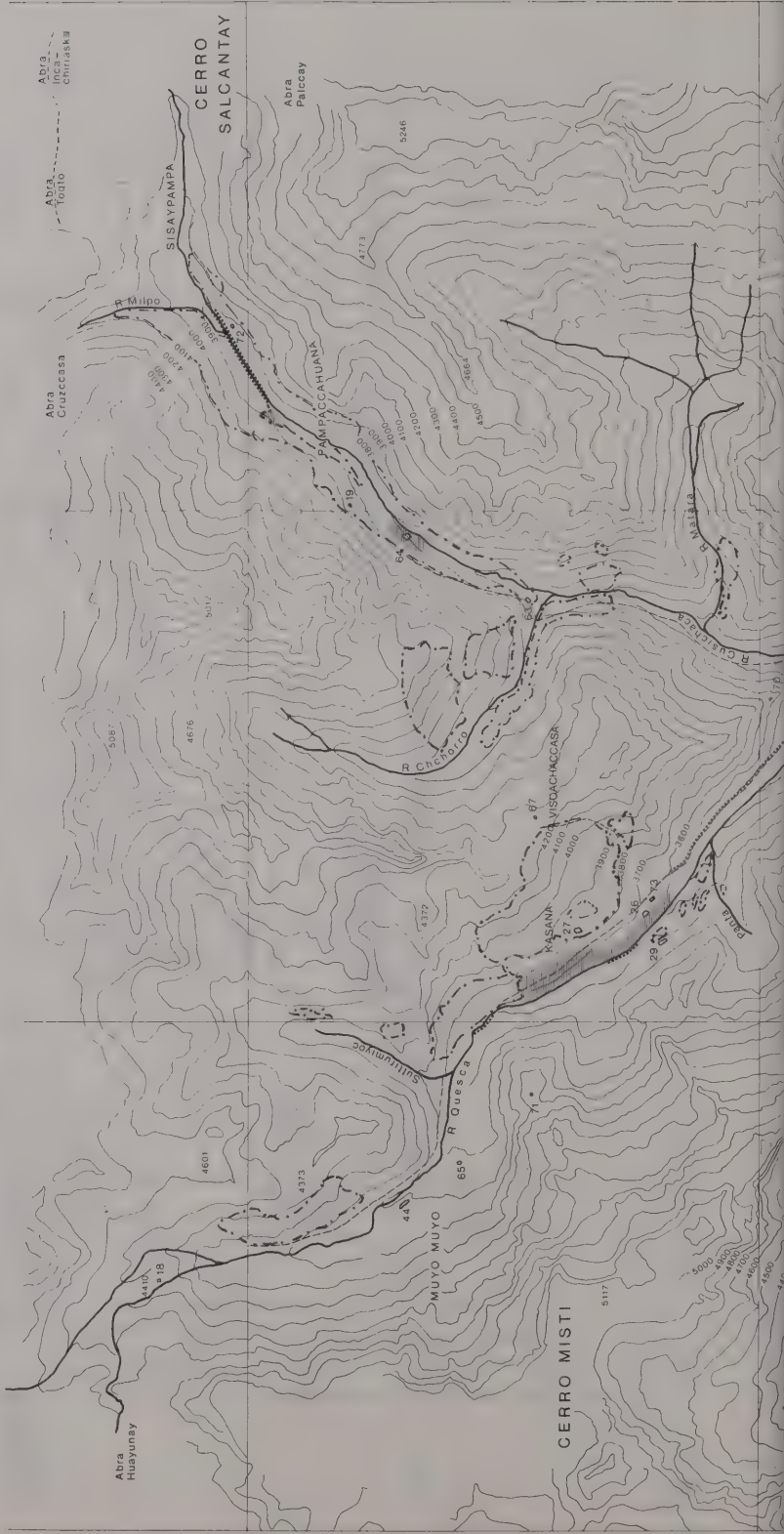
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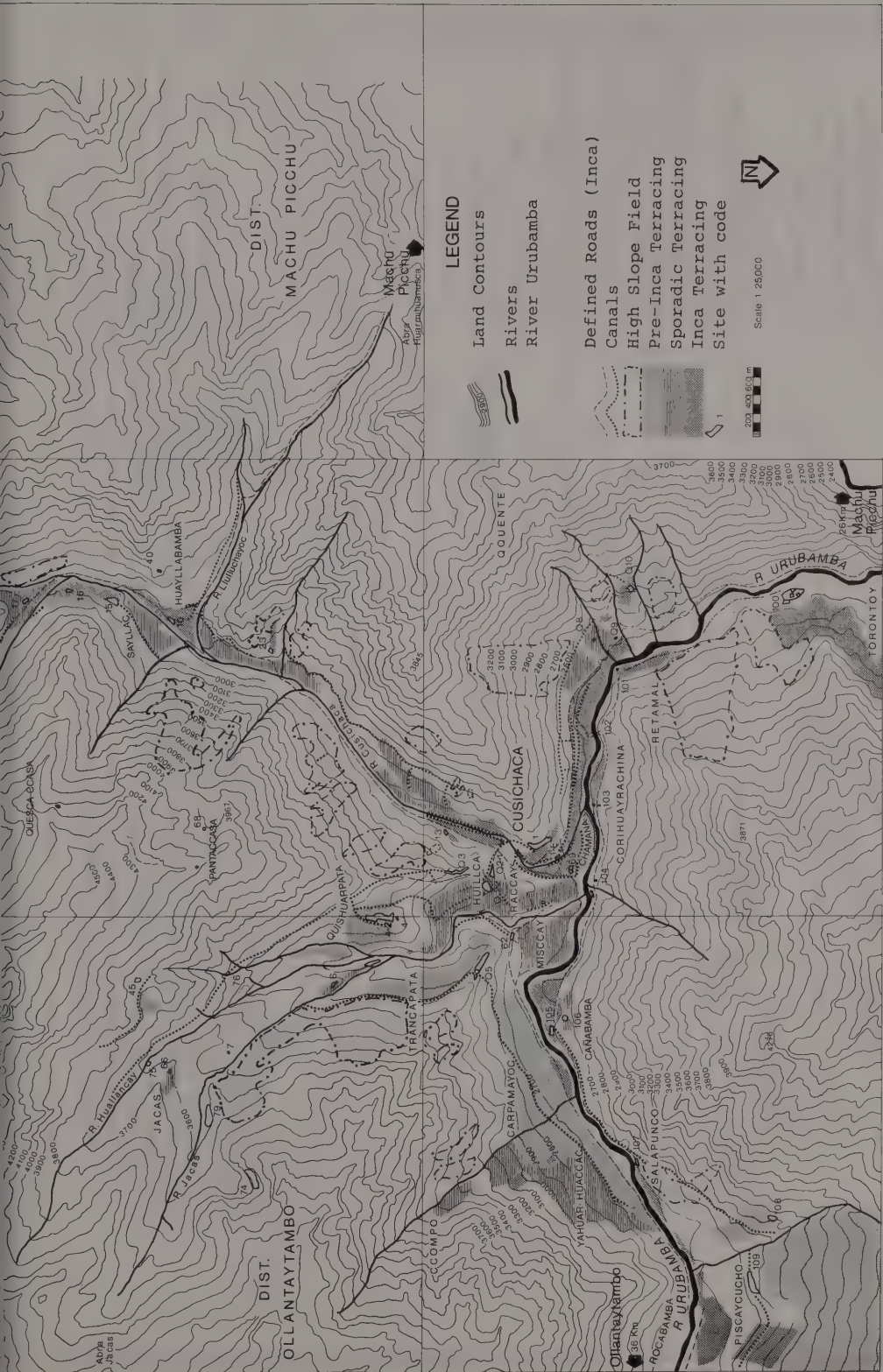
Maps, Figures and Plates

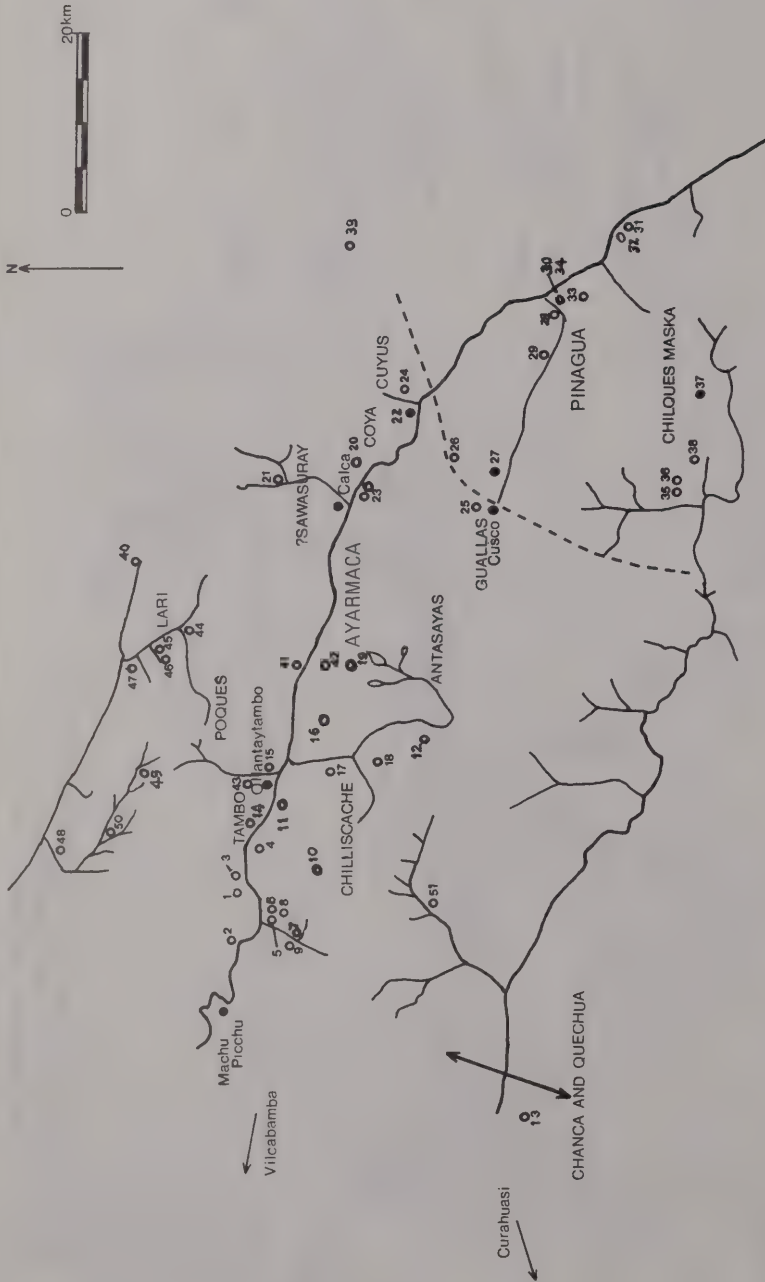


Map 2. Inca and pre-Inca occupation in the Districts of Ollantaytambo (east of the Cusichaca river, and of Machu Picchu (west of the Cusichaca river).

Map 3. Cusichaca area - occupation sites and land-use systems, both sides of the Urubamba river.







Map 4: 1-Choquehuasi; 2-Chakimayo; 3-Piscayacucho; 4-Temporal; 5-Huillca Raccay; 6-Quishuaripata; 7-Saylla; 8-Olleriayoc Trancapata; 9-Coralpata; 10-Ancascocha; 11-Cachiccata site; 12-Huarocondo; 13-Huanipata; 14-Marcay Piri; 15-Pincuylluna; 16-Maras; 17-Socma (Sulcran); 18-Huata; 19-Chincho; 20-Gaitomarca; 21-Ancasmarcha; 22-Pisac; 23-Caqui Xahuana (Waq'ana and Juchuy Cosco); 24-Pucara Pantilliclla; 25-Sacsahuaman; 26-Nawpa Taray; 27-San Sebastian; 28-Pucara at Tipon; 29-Choquepuquio; 30-Piquillacta; 31-Urcos; 32-Huaro; 33-Lucce; 34-Rumi-colla; 35-Mauecallacta; 36-Puma Orco; 37-Paruro; 38-Paccarectambo; 39-Pauctartambo; 40-Amparaes; 41-Urubamba; 42-Raqai; 43-Pumamarca; 44-Lares; 45-Chancapampa; 46-Iali; 47-Cachin (Piscolluna); 48-Occobamba; 49-Piscobamba; 50-Lerquyoc; 51-Limatambo.

Chart 1			Residential				Not Residential						
-No. of site	-Name of Classic site. -x Non-classic Inca.		1-door buildings: -Control type	-Access type -Large "closed" -Small "closed"	-2-door buildings -3-door buildings	2nd-storey lofts: -Confirmed with recess -Expected	Open-fronted buildings: -Shrines -in residential areas -Caverns -Sacred rocks	-Cultivation area (confirmed terraces) in square meters					
1	Patallacta I II III IV (peripheral)		- - - 1 - 12 - 25 - - - 2 1 - - - 37	- 12 - 25 - 13 - 1	- 12 - 25 - 13 - 1	4 4 4 8 - - - -	- 4 - - - 1 - - - - - - - - - -	404413.00					
1-E	Pulpituyoc	I	- - - 4	- - - 1	- - - 1	1 - -	5 - 1 3	*					
2-1	Chuncuchua @ Huillca Raccay	II III IV V	1* - - 2 - - - 12 - - - - 1 - - - 1 - - 1	- - - 4 - - - 2 - - - 1 - - - 1	- - - 1 - - - 1 - - - 1 - - - 1	- - - - - - - 4 - - - - - - - -	- - - - - - - - - - - - - - - -	*					
4-1	Quishuarpata		- - - 4	- - - 2	- - - 2	2 - -	- - - -	*					
8-1	Tarapata		- - - -	- - - -	- - - 2	1 - -	- - - -	(324607.75)					
9-1	Machu Quente		1 - - -	- - - -	2* - -	- - - -	- - - 1	8243.18					
9-2	Tiendachayoc		1 - - 1	- - - -	- - - -	1 - -	- - - -	*					
10	Huayna Quente		1 - - 2	- - - 3	1 - -	4 - -	- 1 2	34267.96					
13	Tunasmocco		2 - - -	- - - 4	- - - -	3 - -	- - - -	135017.65					
17	Paucarcancha		1 - - 8	- - - 3	5 - -	1 - -	- 1 - -	10464.25					
18	Inca Raccay @ Huayunay		- - - 4	- - - 3	- - - -	2 - -	- - - -	-					
20	Patahuasi @ Huayllabamba		? - - 3	? - - -	- - - -	- ? - -	- ? - -	55530.92					
43	Incasamana		- - - 2	- - - 3	- - - -	- ? - -	- - - -	333.88					
62	Miscay		1 - - 1	- - - 6	- - - 2	- - - -	- - - -	(23584.05)					
67 x	Viscachaccasa		- - - 2	- - - -	- - - -	- - - -	- - - -	-					
68 x	Pantaccas		1 - - 2	- - - -	- - - -	- - - -	- - - -	-					
2-2x	Huillca Raccay		1 - - 6	- - - -	- - - -	- - - -	- - - -	*					
69	Chamana		? - - ?	? - - ?	? - - ?	? - - ?	- - - -	187967.09					
Additional sites on north bank of <u>Urubamba River</u> :													
107	Salapunco		2 - - -	- - - -	- - - -	1 1 - -	- - - -	34118.53					
105	Cañabamba		1 - - -	1 - - -	10 - -	2 - - -	- - - -	143199.69					
104	Pinchay Unuyoc		- - - 1	- - - 1	- - - -	- - - -	- - - 1	23199.42					
102-3	Corihuayrachina		? - - 1	- - - 1	- - - -	- - - -	- - - -	57159.31					
100	Torontoy		1 - - 6	- - - 4	? - - -	1 - - -	?* 2 - 1	22019.86					
*	Represented elsewhere												

Fig. 1. Chart 1. Inca sites in the Cusichaca area: breakdown of structures.

Chart 2 : Cusichaca-Huallancay drainages and confluence areas**Estimated area cultivated under irrigation in the Late Horizon:**

	hectares
Inca Terraces	79.1
Terraces of uncertain origin	56.3
Total of export crops	134.4
Terraces - not state built	195.5
Sporadic terraces/ ill-defined	31.1
Cultivated for local use and/or state/elite	226.6
Total of land area available for cultivation	362.0h (x3) = 1086.0 topos

Potential Maximum under protection annually:

Export/state terraces (134.4 x 2 annual crops)	268.8
Local terraces (226.6 x 2 annual crops - 30% efficiency)	317.3
High slope fields (561.7 - 70% fallow loss)	168.5

Potential Maximum under cultivation **754.6h (x3) = 2263.8 topos**

Fig. 2. Chart 2. Estimated area cultivated in Late Horizon: Cusichaca-Huallancay drainages and confluence areas.

Chart 3 : Northern bank of Urubamba from Canabamba-Torontoy:

Land area under cultivation:	hectares
Inca Terraces	30.0
Terraces - not state	0.8
High slope field systems	255.0
Total under cultivation	285.8h (x3) = 857.4 topos

Maximum under production annually :

30.0 (x 2 annual crops)	60.0
255.0 less 70% fallow	75.5
Potential maximum under cultivation	135.5h (x3) = 406.5 topos

Fig. 3. Chart 3 . Estimated area cultivated in Late Horizon: Northern bank of Urubamba, from Canabamba to Torontoy.

Chart 4		Residential				
No. of site	Name of Non-Inca site, probably Late Intermediate Period. x More than one period represented at site. X Inca period also represented at site.	Estimated number of: - 1-door round-oval buildings - Unusually large oval buildings - Rectangular buildings - Subrectangular buildings - Platforms				Cultivation area (confirmed terraces) in square meters
1 X	Pataallacta	?				*
2-1xX	Huillca Raccay (promontory)	?9		1	1	*
2-2xX	Huillca Raccay (tableland) (other evidence)	?65 ?6		?		383464.00/HSFS
3	Ollerlayoc Leoniyoc	3		2	?	8 HSFS
4-2	Quishuarpata	80	6*		5*	8 165626.41
5	Ollerlayoc Tranca-pata/Carpamayoc	80				2 273027.94/HSFS 654123.88 6564.59 -
6	Uncachaca	5				
7	Colpapampa	2				
8-2	Tarapata	3				50793.50
14	Tarayoc	?5				(324607.75)
15 xX	Sayllac	?25				? HSFS
16	Manzanayoc	?25				? HSFS
17 X	Paucarcancha	?3				? (17000.91)/HSFS
23	Urcaypata	?5				(58050.58)
26 X	Rayancancha	?10		5		Sporadic/HSFS
27	Kasana Bajo	6				Sporadic
28 X	Misti, Rayancancha	?5		3		Sporadic
40-1	Coralpata	3				HSFS
40-2	Coralpata	6				HSFS
44	Cerosmocco	10				
45	Uchuypana	? 8				
62-2X	Miscay various	5				207321.32
64 xX	Pampaccahuana Bajo	?6		3		Sporadic
65	Muyo Muyo Bajo	?				
66	Tintinmocco	?8+				Sporadic
73	Patawasi	?1+				HSFS
74 ?	Yanacocha	? 30				HSFS
75 ?	Yanamayo	10+				Sporadic
76	Carpenterlayoc	10+				Sporadic
78	Yahuar Huaccac	xX ?10				390890.06 -
79	Cuñacayoc	?20				
11	Masocucho	?		?	?	Sporadic
50	Ccompo	?				Sporadic/HSFS
Additional sites on north bank of Urubamba River:						
108	Choquellusca	?		?	?	Sporadic
106	Cañabamba	X ?6		?	?	* HSFS
101	Retamal	?		?	?	Sporadic/HSFS
112	Torontoy :Chakimayo	?10				Sporadic/HSFS
	Padrillo	?35				

Fig. 4. Chart 4. Pre-Inca sites (Late Intermediate Period) in the Cusichaca valley

Chart 5: Cusichaca-Huallancay drainages and confluence areas

Estimated area cultivated under irrigation in the Late Intermediate Period:

	hectares
Terraced	195.5
Sporadic terraces/ill-defined	31.3
Beneath the Inca terraces	79.1
Terraces of uncertain origin	56.3
Total of land systems available for cultivation	362.2 (x3)=1086.6 topos

Estimated area cultivated without irrigation in the Late Intermediate Period:

High slope field systems, and fallow areas attributed to this period.	518.6 (x3)=1555.8 topos
---	--------------------------------

Maximum under cultivation annually:

with irrigation	363.5
without irrigation (518.6 less 70% fallow)	155.6

Potential maximum under cultivation	417.8 (x3)=1253.4 topos
--	--------------------------------

Fig. 5. Chart 5. Estimated area cultivated in the Late Intermediate: Cusichaca-Huallancay drainages and confluence areas.



Fig. 6. Plan and excavations at Cuncuchua, Huilca Raccay fort, Q2-1, 1975, 1978-88.



Fig. 7. Plan and excavations at Patallacta, Q1, 1973, 1979-87.

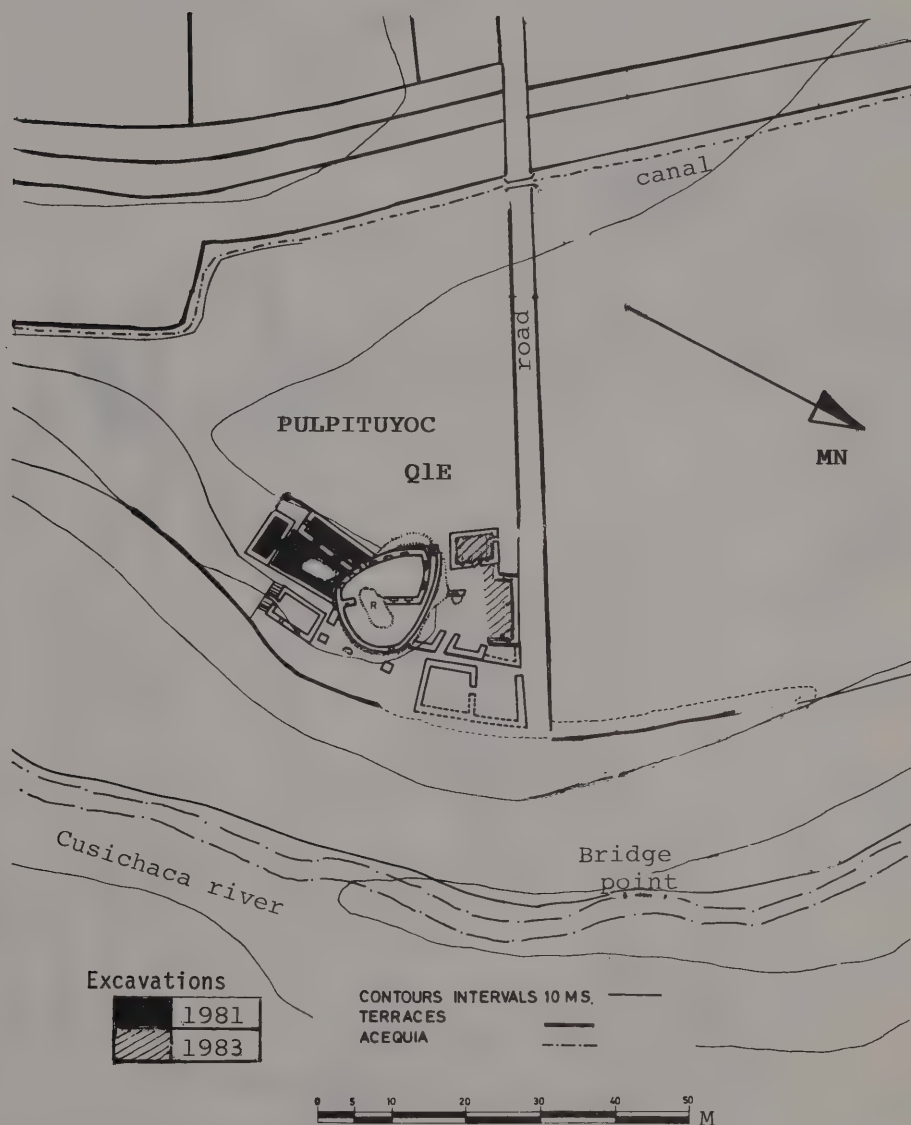
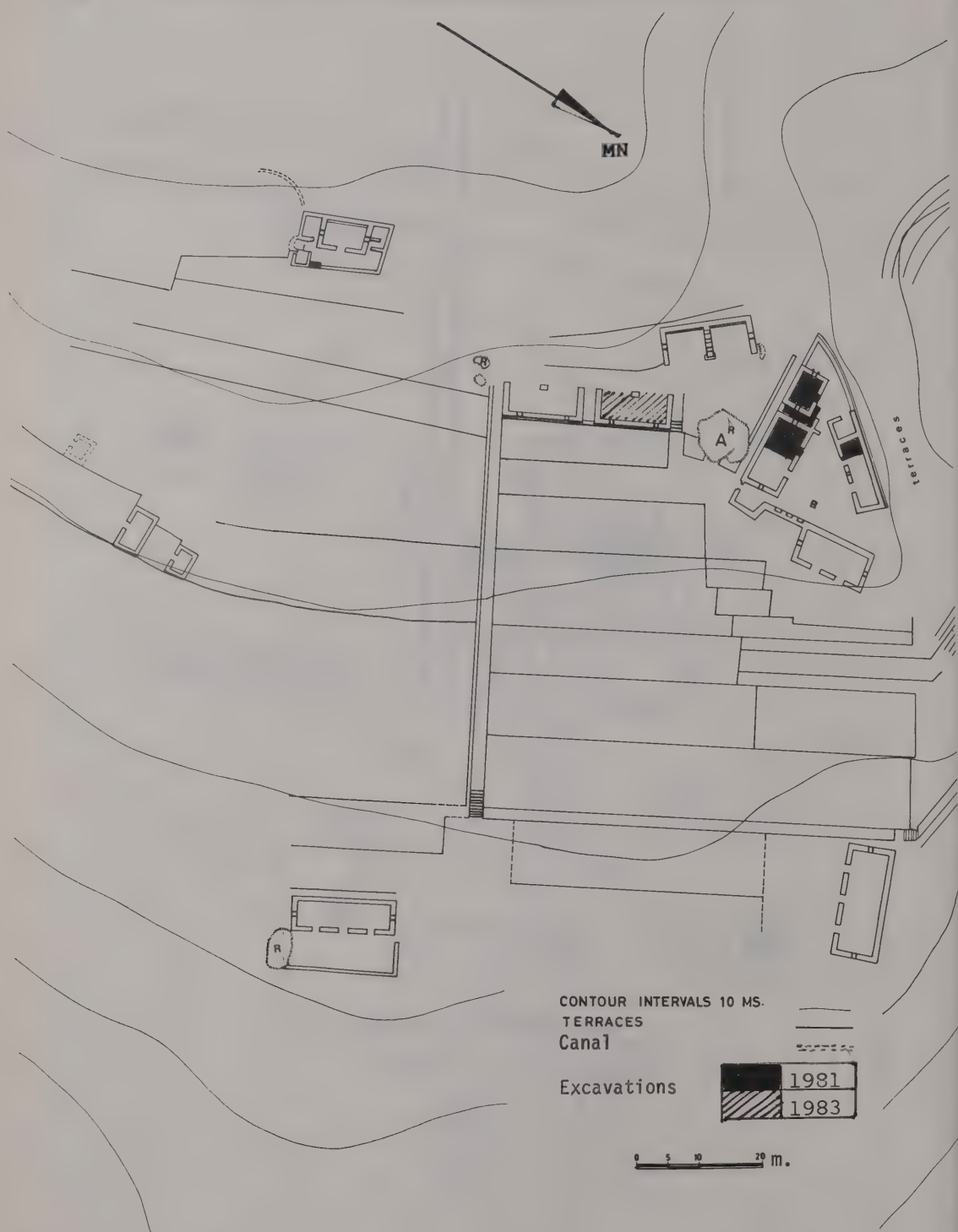


Fig. 8. Plan and excavations at Pulpituyoc, Q1E, 1981-2.



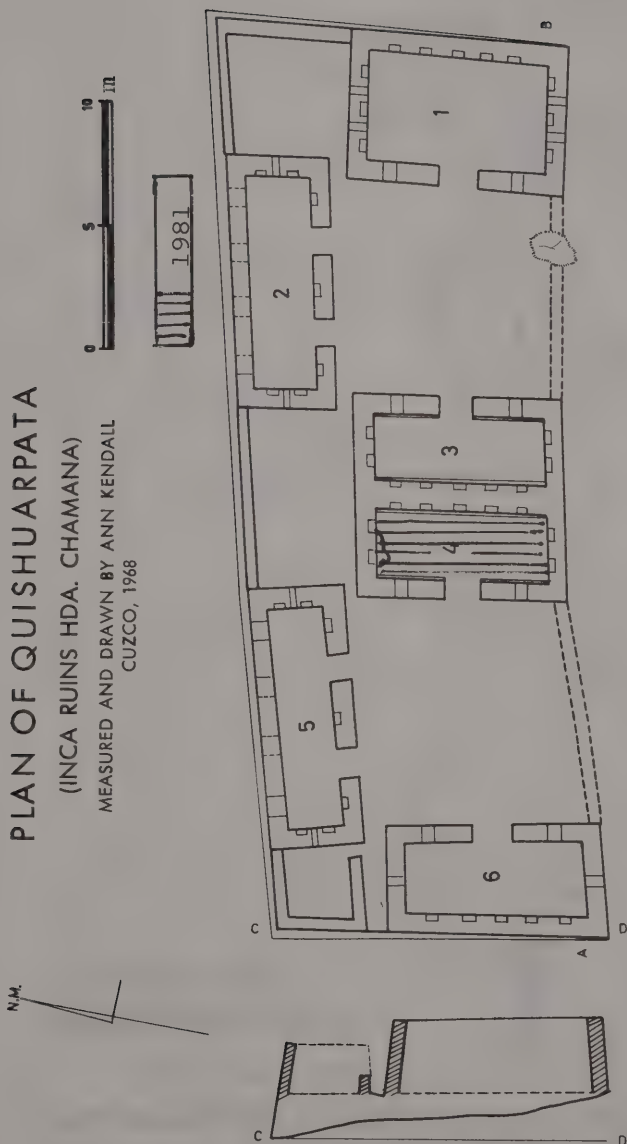


Fig. 10. Excavation plan at Quishuarpata, Q4-1, 1981.



Fig. 11. Excavations at Huilca Raccay tableland, Q2-2, (1983-87); showing early courtyard and buildings pre-dating the Late Intermediate Period.

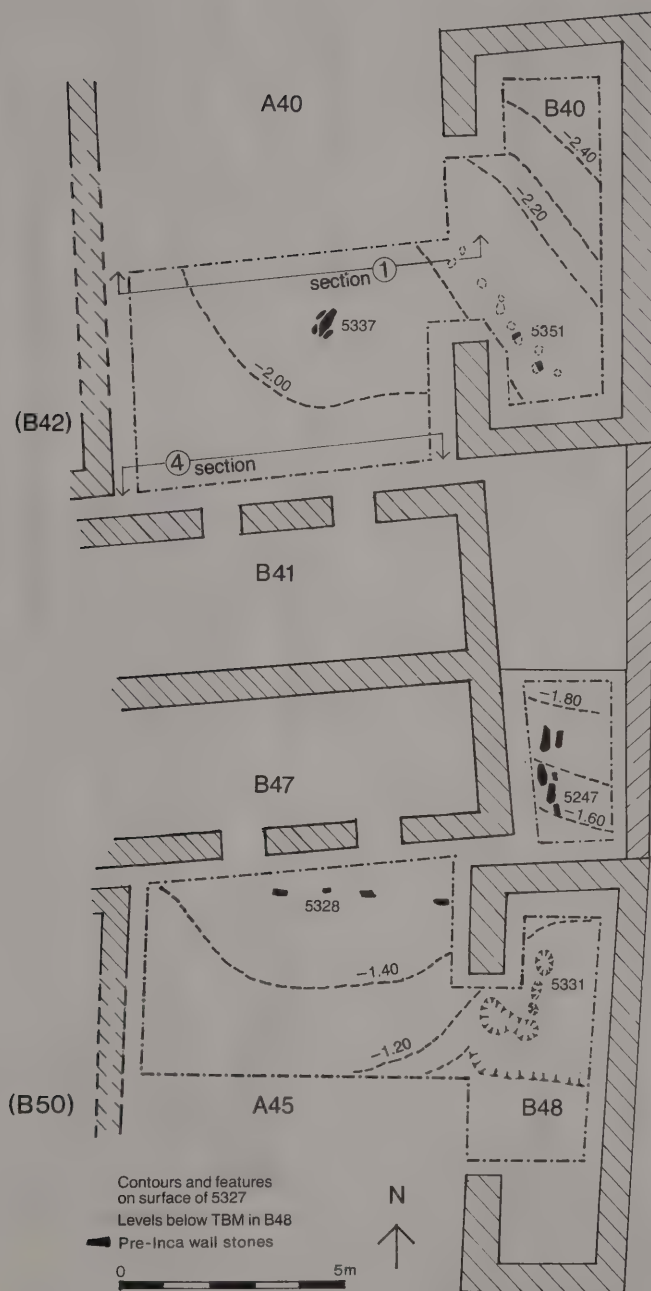


Fig. 12. Sector II excavations at Patallacta, Q1, 1987: Plan of Inca remains A45/B48; A44 and A40/B40, showing pre-Inca occupation under the Late Intermediate Period agricultural horizon.

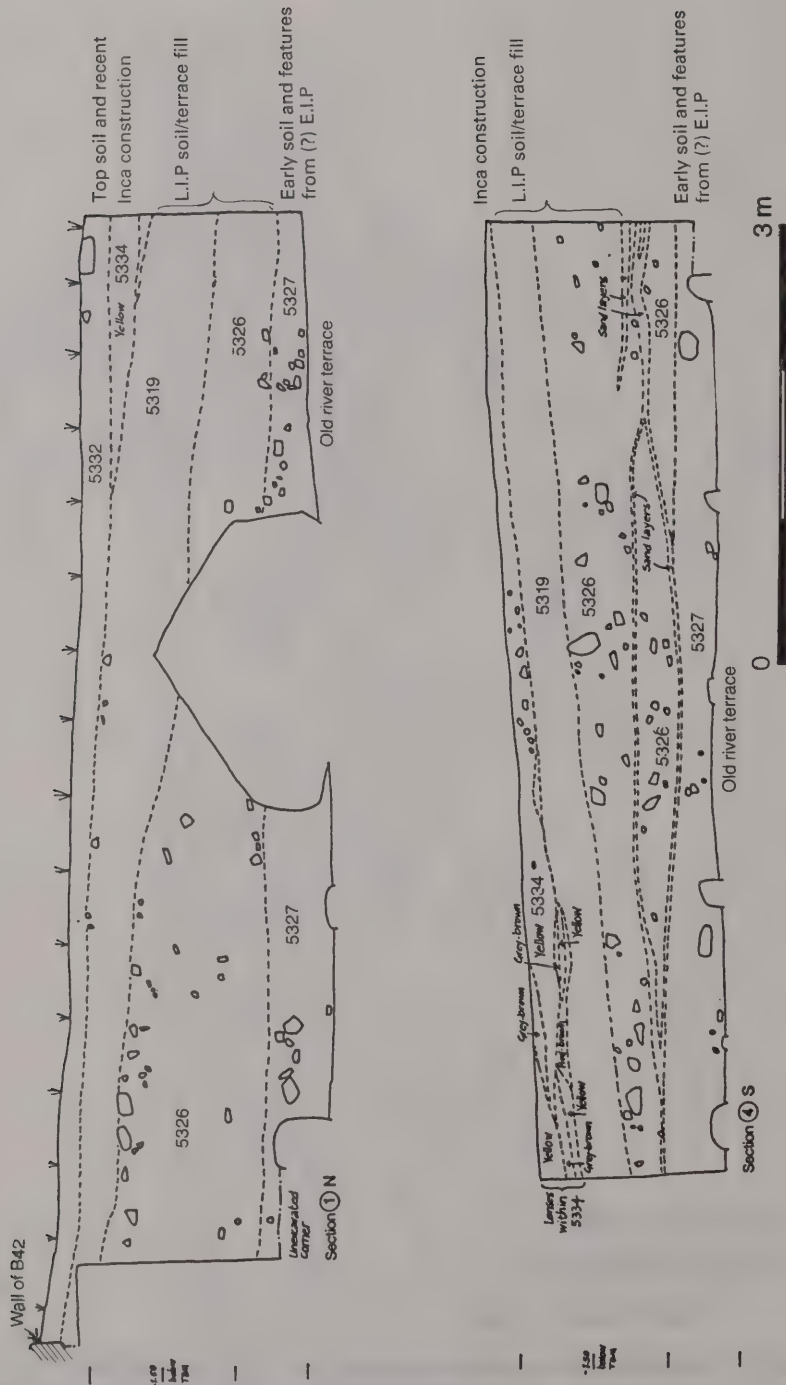


Fig. 13. Sections, Sector II, A40, pre-Inca levels in Q1.



Fig. 14. A6 excavations at Huillca Raccay, Q2-1, (1985-88): Plans of Early Intermediate Period wooden structures: a) earliest; b) mid; c) latest.

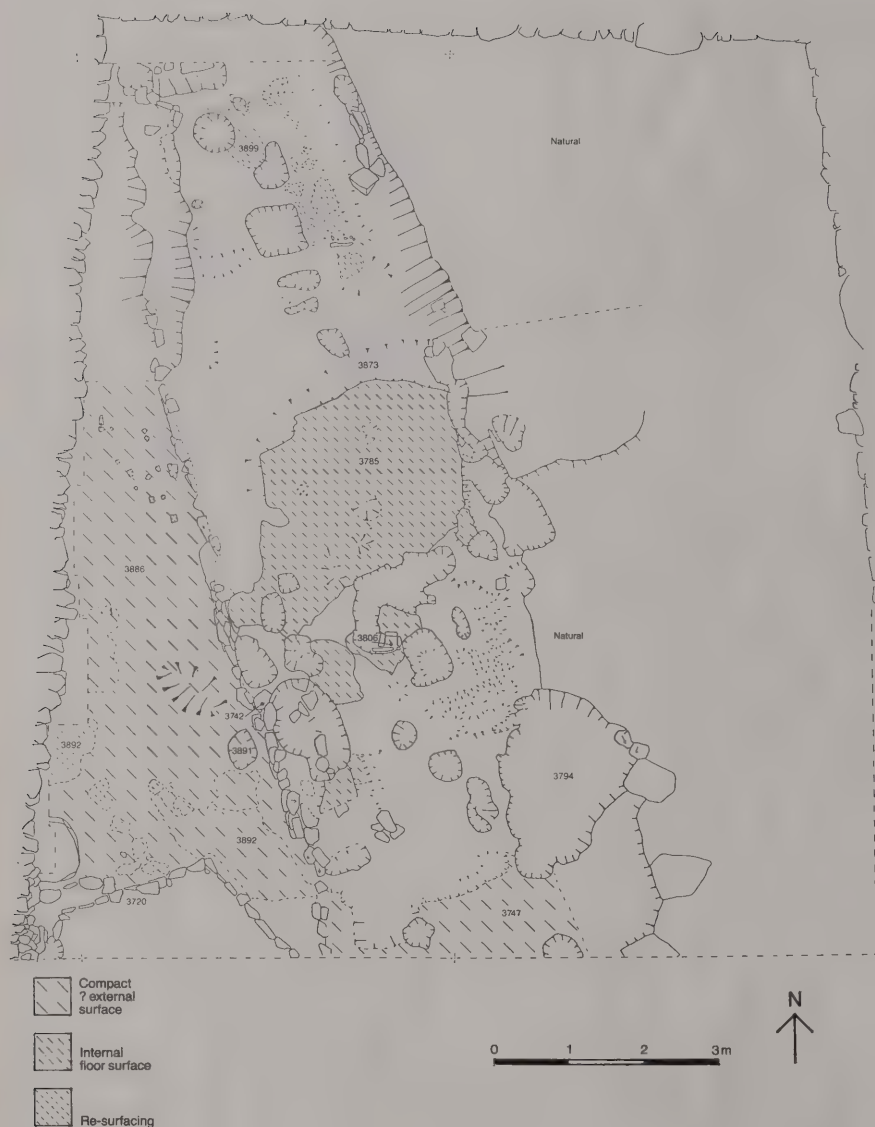


Fig. 15. A6 excavations at Huillca Raccay, Q2-1, (1987): Plan of Early Intermediate Period structure 3785 with contemporary features.

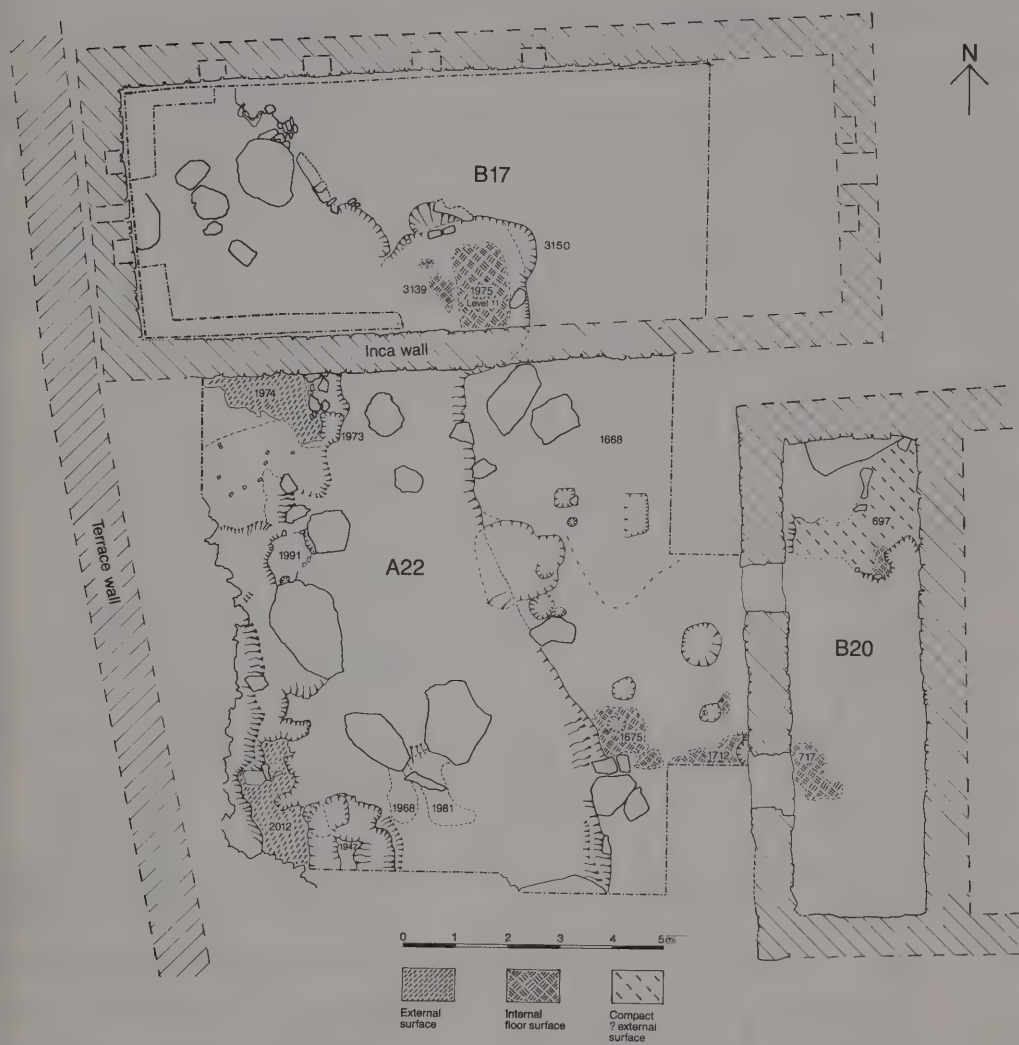


Fig. 16. A22, B17 and B20 excavations at Huilca Raccay Q2-1. (1985), showing the Early Horizon Period features and structure 1975.

Chart A

CUZCO			CUSICHACA		
Chronology	Ethnohistory & Architecture	Ceramics	Phase	Architecture	Ceramics
Late Horizon, Imperial Inca [=Inca 4]	Expansionist Classic Inca architecture	↑	J	Classic/ Inca	↑
Late Intermediate Period: Transition [=Inca 3]	Pachacutec in Cuzco: "20 years" Classic Inca architecture	↑	D-H	Latest "pre-Inca" house (sub rectangular form) Q2-1-A22	↑
CHANCA WAR - INCA TRADE INTENSIFIES					
Late Intermediate Period: Early Inca [=Inca 2]	"Viracocha Inca" Proto-classic Inca architecture ↑	classic Cuzco-Inca pot ↑	C	?Ayarmaca Federation. Circular forms and top of upper terrace-Q2-1 - A22	prov. Inca Cuzco-Inca Killke + other
INCA TRADE BEGINS					
Late Intermediate Period: Early Inca [=Inca 1]	"Manco Capac" Rectangular architectural forms. ↑	classic Cuzco-Inca pot must begin ? ↑	C lower	?Ayarmaca Federation. (circular forms) terrace Q2-1 - A6(?) Q2-1 - A22	prov. Inca (copies of Cuzco-Inca), Killke + other L.I.P. (Only 2 sherds of Cuzco Inca)
Late Intermediate Period: pre-Inca	Alcabizas Ayarmaca Pinahua Rectangular and subrectangular architectural forms.	Killke ↑	B	Ayarmaca Federation (circular forms) Q2-1 - A6 Q2-1 - A22	Killke + other

Fig. 17. Chart A Chronological sequence: Late periods Cuzco/Cusichaca comparison.

Chart B

PERIOD	CUZCO ARCHAEOLOGICAL STYLES/CULTURES	DATE/OR ESTIMATED DATE AND COMMENTS ON CUSICHACA CHRONOLOGY
Initial	Marcavalle in Cuzco 1200 - 800 BC	
Early Horizon	Chanapata 800BC - 300BC ?Pacallamocco in Cuzco.	Phase I (Q2-1, A22) c. 800 BC - 300 BC Pure Chanapata type of ware, as in Cuzco.
Early Inter-mediate	Not clarified in Cuzco c. 300 BC - AD 600	Phase II continuation of Chanapata-related types. Phase III a) continuation of "Son of Chanapata" type. b) Pacallamocco. c) Appearance of creamware with dark painted decoration estimated about AD 300.
Middle Horizon	- Huari occupation in Cuzco AD 600 - 900 - Qotacalle (according to Rowe) but may start earlier.	Phase IV (Q2-2) C. AD 600 a) Locally non-classic Huari utilitarian wares are derived from the Chanapata-related type. b) bowls in red clay with incurving rims. c) a creamware (slightly rosy) with watery black decoration. Phase V (Q2-1) A quartz tempered fabric predominates.
Late Inter-mediate	"Killke" in Cuzco (See Chart B) AD 900 - 1450 Early Inca in Cuzco c. AD 1200 -	AD 900 - c. 1450+ "Killke-related" wares, local and imported types. An overlap in production of regional Killke wares with imported Cuzco-Inca in 15th century. Some Killke-related wares and types can be phased using the carefully controlled excavations at Cusichaca.
Late Horizon	Imperial Inca AD 1450 - 1534	Classic Cuzco-Inca imports and provincial wares. Inca occupation arrives at Cusichaca in the reign of Inca Pachacutec c. 1450.

Fig. 18. Chart B Outline of full chronological sequence: Cuzco-Cusichaca comparison.



Plate 1. Aerial view showing the Cusichaca confluence: Cusichaca centre: Huilca Raccay fort and tableland site lower right. 1979.



Plate 2. Huillca Raccay (Q2-1) promontory 'fort', foreground; Patallacta (Q1) town, background left; Pulpituyoc (Q1E) at river bank, background right.



Plate 3. Patallacta showing INC consolidation team at work: Sector IV foreground; Sector I background. 1982.



Plate 4. Circular structure, Olleriayoc Trancapata (Q5) ridge site, looking north.

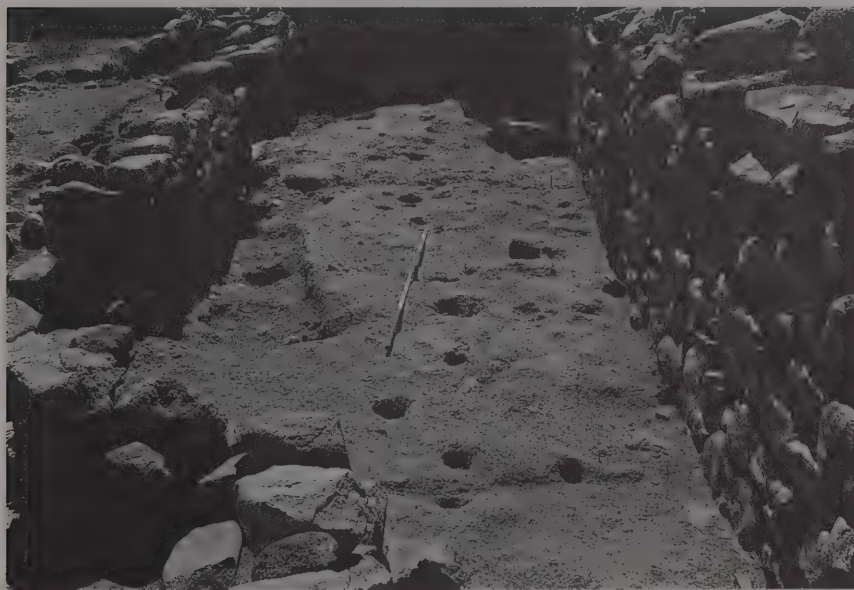


Plate 5. Post holes in Inca building B20, (Q2-1) looking north, 1989.



Plate 6. Post Inca partition in Inca building B13, Sector I, (Q1), looking west 1983.



Plate 7 .Stone-edged platform in Inca building B45, Sector II, (Q1), looking SE, 1985.



Plate 8. Boulders used as stone furniture in A110, Sector II, (Q1), looking east 1981.



Plate 9. Inca floor preserved in B5 at Huayna Quente (Q10), looking east 1981.



Plate 10. Subrectangular structure in A22 (Q2-1), Late Intermediate Period. 1983, looking NW.



Plate 11. Corner quadrant excavated in circular structure at Quishuarpata (Q4-2), Late Intermediate Period. 1981.



Plate 12. Oval/subrectangular structure (Q2-2), looking west 1983.



Plate 13. Terrace wall defining a court area with detail of central court feature, (Q2-2), looking north 1985.



Plate 14. Extension of the Q2-2 excavations in 1987; walls and sub-square structure at mid-right, looking south.



Plate 15. A massive wall cuts a narrow earlier wall on Q2-2, excavated 1987, looking east.



Plate 16. Pre-Inca levels excavated under the Inca courtyard A45, Sector II, (Q1). 1987.



Plate 17. Several phases of slab marks for wooden structures in A6 (Q2-1): Wooden structure 7135 at left, Early Intermediate Period, looking west 1988.



Plate 18. Floor of subsquare structure in A6, (Q2-1), Early Intermediate Period, 1987.

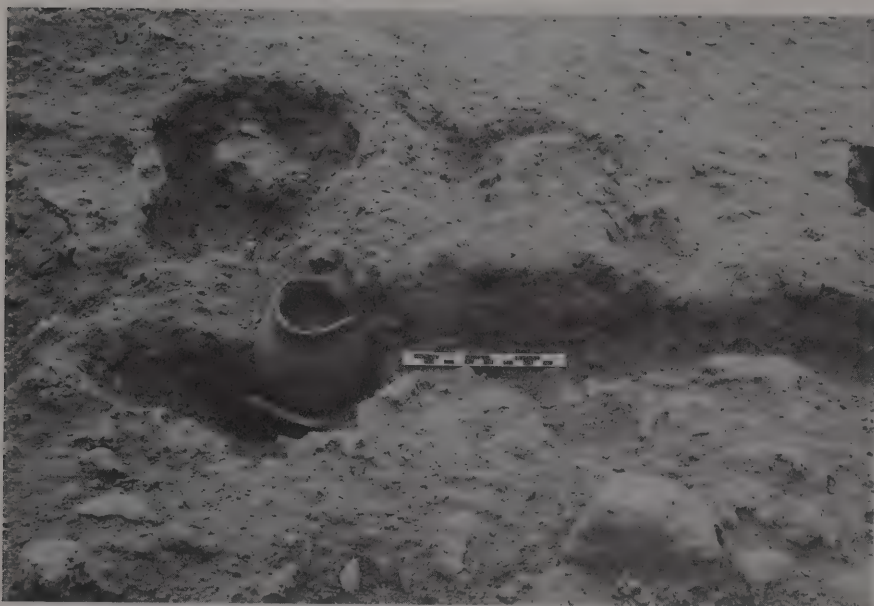


Plate 19. Pot excavated from pit in A6, (Q2-1), Early Intermediate Period, 1987.



Plate 20. Hearth, feature 3729, excavated on floor in A6, (Q2-1), Early Intermediate Period, 1988.



Plate 21. Crouched burial in A22, (Q2-1), Early Horizon Period, 1985, looking SW.



Plate 22. Vestiges of a subcircular structure of the Early Horizon Period B17, (Q2-1), floor surface at right, 1985, looking east.

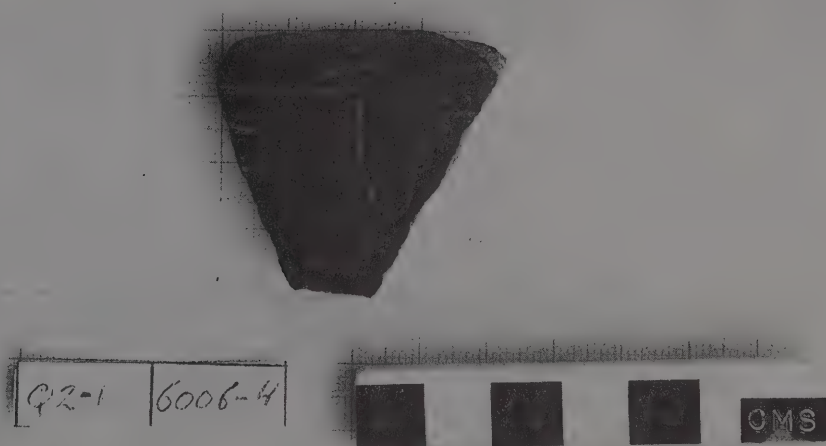


Plate 23. Potsherd: Phase 1, early Horizon, Q2-1: rim with incised design, unoxidised example.

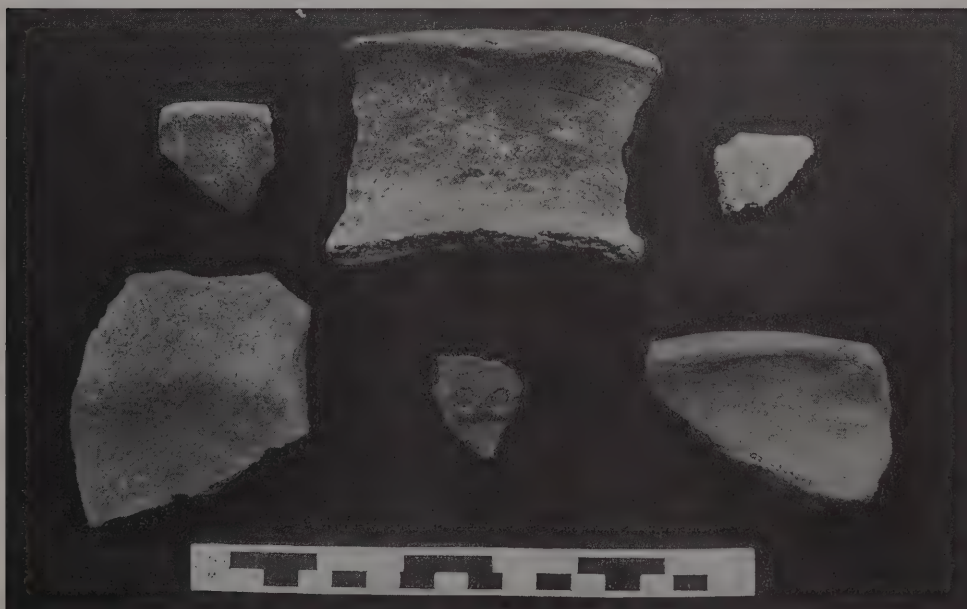


Plate 24. Potsherds: Phase 3a, Early Intermediate, Q2-1.

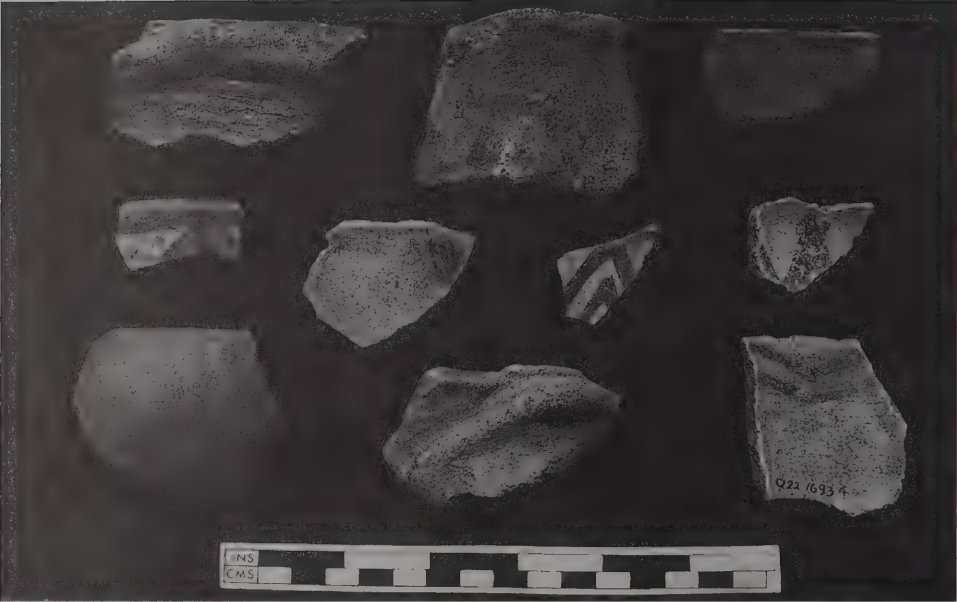


Plate 25. Potsherds: Phase 4a, Middle Horizon, Q2-2: provincial utilitarian ware.

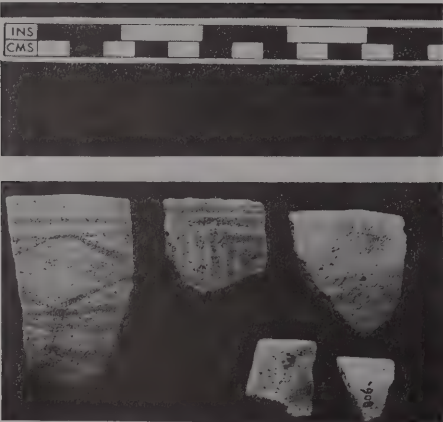


Plate 26. Potsherds: Phase 4c, end of Early Intermediate/Middle Horizon 01: regional fine-ware.



Plate 27. Potsherds: A Killke-related ware, Early Late Intermediate; characterised by its fabric and a white line outline decorative elements. otherwise very similar to the 'Killke' style in its forms and geometric design elements.

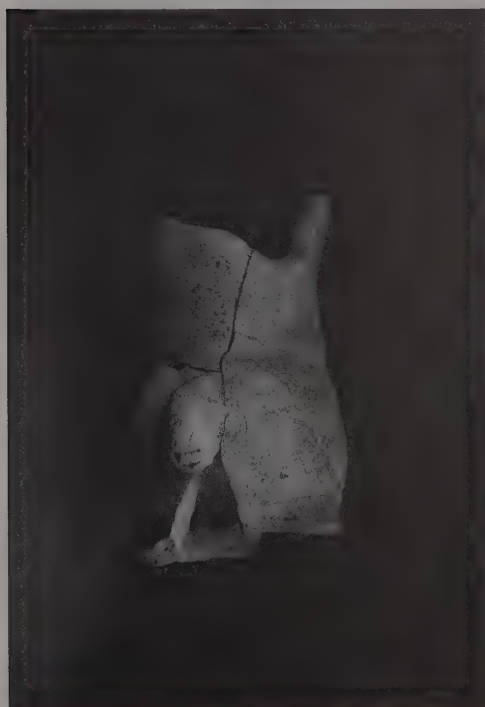


Plate 28. Potsherds: 'Killke' style, Ware 45, throughout the Late Intermediate: the neck of a double (two-tiered) pot.

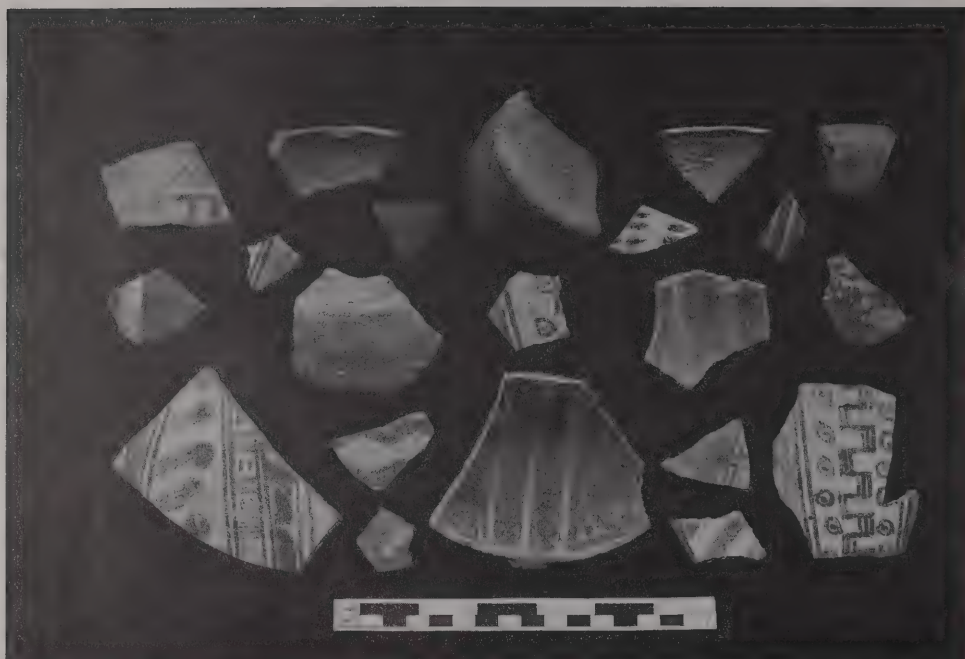


Plate 29. Potsherds: Inca - provincial and regional types.



Plate 30. Two *tupu* found with Inca burial in A40, sector II, Patallacta, 1987.

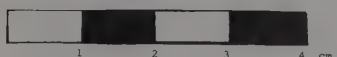
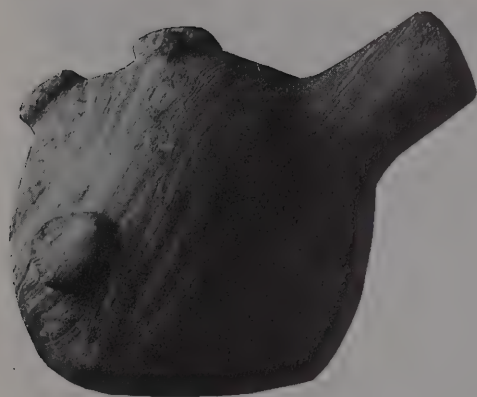


Plate 31. Lithic sculpture: stone-carving of a llama - ritual object.



Plate 32. Lithic implements used in food preparation: Bowls (left and bottom); 'rockers for grinding and mashing (top right).



Plate 33. Lithic implements: slate knife (left); diorite axe head (right).



Plate 34. Animal bone implements.



Plate 35. Irrigation canal circumventing terraces beside the Cusichaca river.



Plate 36. Irrigation canal descending from Quishuarpata to the Huilca Raccay tableland.



Plate 37. The Blacksmithy established at Chamana by the project in 1985.

Analysis and Comparison of Some Prehistoric Projectile Points from Egypt

by D.L. HOLMES*

Introduction

This contribution represents a much expanded version of a manuscript first written in 1984 which takes into account the relevant literature that has appeared since then.

Although lithic projectile points¹ are generally considered to be characteristic of many early and middle Holocene assemblages from the Western Desert of Egypt, they are only occasionally found in any significant abundance. The recovery, therefore, of 45 specimens from a number of sites in one small area, all representing the same post-Palaeolithic² tradition, is a fortunate circumstance. The projectile points in question come from eight find localities in the northern part of Kharga Oasis in an area known as Umm el-Dabadib (Figs. 1 and 2). This is characterized by a playa and dune landscape with Pleistocene pediments abutting the scarp of the limestone plateau. Today the region is very arid, though there is some limited vegetation in places.

The author worked in this region in December 1983 as a member of a joint Cairo University/Egyptian Geological Survey project which was primarily concerned with the Quaternary geology of the area. The archaeological activities were limited to site survey and systematic surface collection, but even as such, they represent the first main archaeological investigation of the region since the work of Gertrude Caton-Thompson and Elinor Gardner around sixty years ago (Caton-Thompson, 1952), though a brief visit was made by C. Vance Haynes and R. Said in 1977. Actually Caton-Thompson herself did not visit the Umm el-Dabadib area. It was explored by her colleague, Miss Gardner, during a third (and final) field season in Kharga Oasis in 1932-33 when Caton-Thompson was unable to travel to Egypt.

The Sites

In her monograph, Caton-Thompson reported that there was a large number of surface archaeological occurrences in the Umm el-Dabadib area. She believed them to be mixed 'Bedouin Microlithic' and 'Peasant Neolithic' (Caton-Thompson, 1953: 36). Based upon her knowledge of the prehistoric assemblages she had encountered in other parts of the Kharga Depression, she considered artifacts such as the arrowheads and double-backed perforators as 'Bedouin Microlithic'

¹ In this paper, the terms 'projectile point' and 'arrowhead' are used interchangeably, though 'projectile point' is the preferred term. While the specimens described are likely to have served as arrowheads, no assumptions about their precise function (e.g. spear points vs. arrow tips) are made.

² The writer prefers to reserve the term 'Neolithic' to refer to groups where it can be demonstrated that they had a food-producing economy. At the moment, there is no subsistence evidence for the sites at Umm el-Dabadib. The fairly abundant projectile points may indicate a dependence on hunting, though the grinding stones present could have been used to grind cultivated cereals. Alternatively, however, it is possible that they could have been used for processing wild plants (cf. Harlan, 1989), or used in some non-subsistence activity. Also there is no pottery. Thus the term 'post-Palaeolithic' seems more appropriate for the Umm el-Dabadib occurrences than does 'Neolithic'.

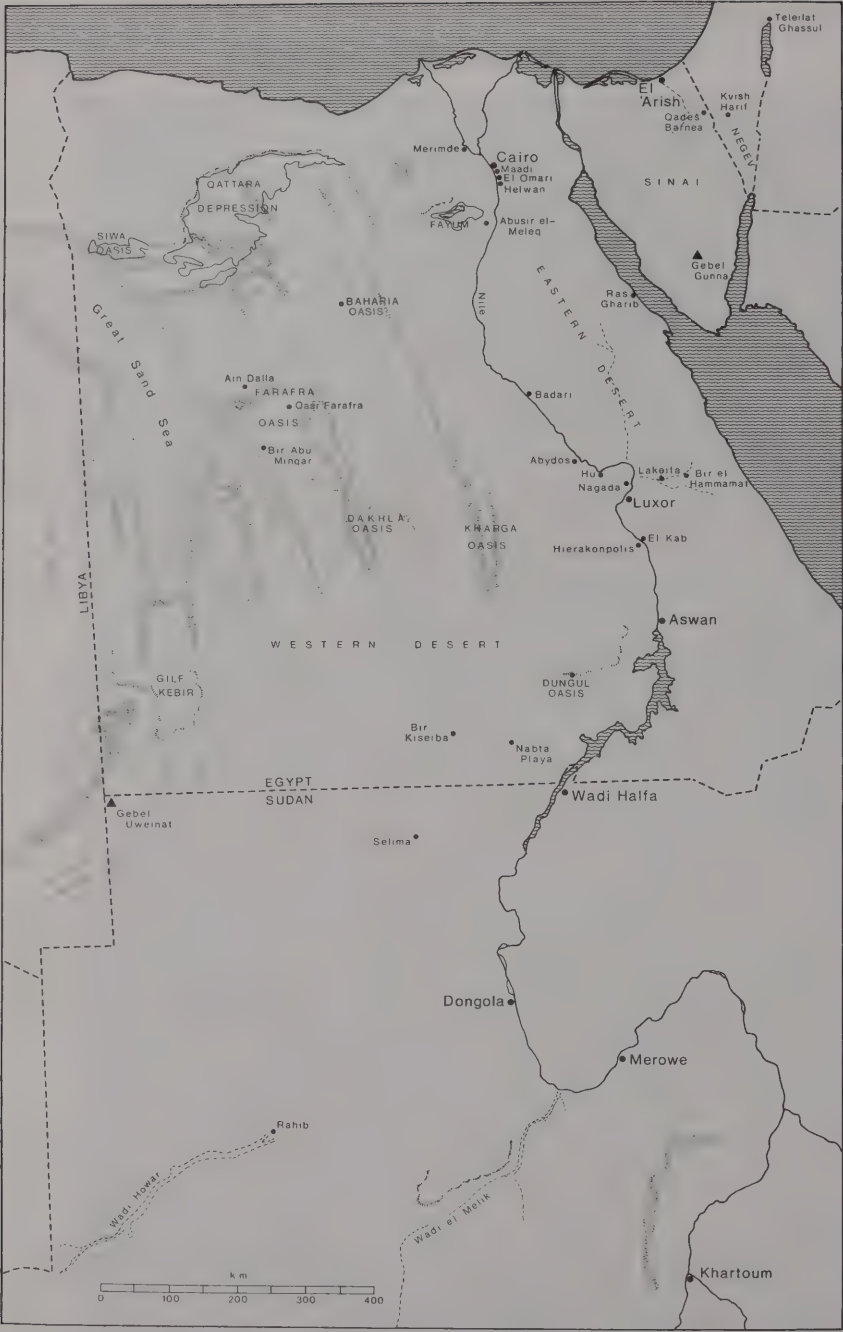


Figure 1. Map of northeastern Africa showing the location of places mentioned in the text.

while she classed all the flake tools and irregularly worked thin natural chert slabs as 'Peasant Neolithic'. The more recent field investigations, however, indicate that the Umm el-Dabadib material is not mixed but rather belongs to a single post-Palaeolithic industry.

A total of 14 post-Palaeolithic sites³ were located in the 1983 survey. Typically, the sites consist of thinly spread surface scatters of lithic artifacts, grinding stone fragments, fragments of ostrich eggshell, and rare bone splinters. No pottery was found. Structures are limited to a deflated hearth at one site (KO21) and several small circles of unmodified limestone blocks, 1-2m in diameter, at another (KO19). These are all surface occurrences. However, it is evident that these sites have been exposed relatively recently, almost all of them having been deflated from a thick sequence of playa deposits.

Hassan (pers. comm.) has correlated these playa sediments with an early Holocene moist phase, dated to ca. 8600-7100 bp, in his Holocene palaeoclimatic sequence for the Western Desert (Hassan, 1986). Alternatively, this playa unit may correlate with Wendorf and Schild's (1984) Playa III phase, dated ca. 7700-5400 bp. Certainly, the Umm el-Dabadib deposits must be largely contemporary with the basinal sediments in the adjacent Dakhla region which date between ca. 9000 and 5000 bp (Brookes, 1989). Archaeologically, the Umm el-Dabadib post-Palaeolithic assemblages share many similarities with those of the Bashendi cultural unit in Dakhla. This latter dates mainly between ca. 6200 and 5200 bp (McDonald, 1985). However, there are several dates which, if their association is correct, would extend the range of the Bashendi unit to the 8th millennium bp (Brookes, 1989). Early Holocene industries of the earliest 8th millennium bp and older in both Kharga and Dakhla have little in common with the Umm el-Dabadib or Bashendi traditions. An additional indication of the age of the Umm el-Dabadib sites is a radiocarbon date of 7220 ± 150 bp (UCR-1043) on ostrich eggshell obtained from the area by C. Vance Haynes (pers. comm. to F. Hassan). Thus, although the Umm el-Dabadib occurrences have not yet been securely dated, they probably belong mainly to the 7th-8th millennia bp.

Systematic surface collections (mostly 10 x 10m squares) were made at 8 sites (MS1, KO6, KO7, KO8, KO10, KO19, KO21 and KO24). Each locality yielded only a relatively small number of artifacts, which consist predominantly of chipped stone objects (the lithic data are summarized in Holmes, 1989; 380 table 11.3). With the assemblages recovered being rather similar to each other, it was evident that they belonged to the same tradition.

The lithic raw material is primarily local flint, though a very small quantity of quartz (0.5%) was used. Most of the lithic artifacts consist of flakes and knapping debris. The cores are dominated by very reduced irregular flake cores. Although a few blades were found, there are no blade or bladelet cores.

The Umm el-Dabadib tools consist chiefly of endscrapers, notches, denticulates, retouched pieces and projectile points, the latter forming 12% of the tools overall. Also present are a few burins, truncations and bifacial tools. However, no geometrics, backed bladelets or microburins were recorded for any of the systematic collections. In addition, rare surface finds outside of the systematic collection areas include planes, double-backed perforators and scrapers on side-blow flakes. The tools were often made on thin tabular pieces of flint, sometimes wafer thin (2-3mm

³ In addition to these post-Palaeolithic sites, a few Palaeolithic artifacts were encountered, mostly as isolated surface finds, though one locality produced several artifacts. Typologically, these Palaeolithic finds, where they are identifiable at all, appear to belong to the Middle Palaeolithic.

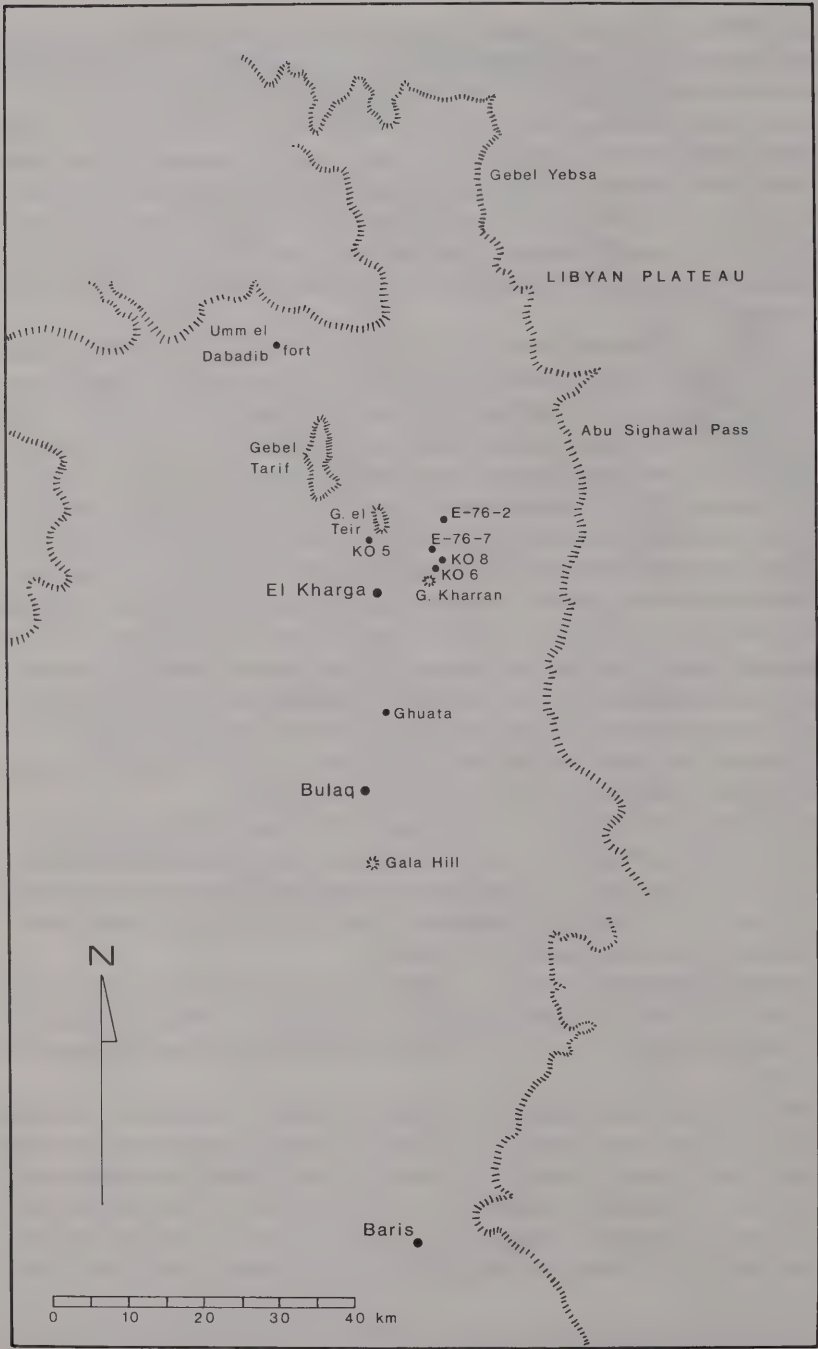


Figure 2. Map of Kharga Oasis.

thick), as well as on flakes.

In addition to this lithic industry, a number of hammerstones were recovered. Most appear to be exhausted flint cores, though there are also a number (30%) of quartzite hammerstones. The grinding stones are chiefly made of local sandstone and occur mainly as fragments. However, it is clear from whole and nearly whole specimens that they constituted large lower grinding stones, and smaller oval handstones. Ostrich eggshell fragments were also noted at most sites and two sites (KO19 and KO21) produced ostrich eggshell beads.

The Umm el-Dabadib post-Palaeolithic sites share a number of similarities with Caton-Thompson's 'Peasant Neolithic' mound spring sites (Caton-Thompson, 1952: 36-38, 165-187) in the central area of the Kharga Depression near the modern airport, and with three 'Late Neolithic' sites (E-76-2, E-76-7 and E-76-7a) excavated by Wendorf and co-workers (Wendorf and Schild, 1980: 189-203) also in the same general area (Fig. 2). A radiocarbon date of 5450 ± 80 bp (SMU-741) was obtained on ostrich eggshell for E-76-7, and two other samples (both charcoal) from Late Neolithic contexts yielded dates of 4740 ± 60 bp (SMU-408) and 4650 ± 60 bp (SMU-412; Haas and Haynes, 1980). Consideration of this material suggests that it represents a continued development of an earlier post-Palaeolithic phase as represented by the Umm el-Dabadib sites (Holmes, n.d.).

The projectile points described below come from systematically collected surface units (at sites KO7, KO10, KO19, KO21, KO24 and MS1) as well as from outside these units, and a further two specimens represent isolated finds made near geological test pits.

Since so few projectile points were recovered from any single locality in the Umm el-Dabadib area, and because the material remains from each site pertain to the same early post-Palaeolithic tradition, the projectile points have been studied as a group.

Analysis of the Projectile Points

Raw material and blank selection (Table 1, p.130)

All the Umm el-Dabadib projectile points are made on flint. Of the 45 points recovered, 15 (33%) are made on thin tabular slabs of raw material, while a further 10 (22%) have a remnant natural surface on one side and therefore may have also been made on such natural thin slabs of raw material. Ten (22%) are clearly made on secondary blades; 5 (11%) fall into an indeterminate secondary flake or blade category, though it seems likely that these pieces were also made on blades. The blank selected is completely indeterminate in 5 cases.

Thus it would appear that predominantly natural thin pieces of flint and secondary blades were selected for manufacture into projectile points. The frequency of projectile points made on blades is surprising in view of the general absence of blades and blade tools from the Umm el-Dabadib assemblages, though rare double-backed perforators on blades have been found. It seems, therefore, that blades were manufactured for conversion into a few specific tool types, namely double-backed perforators and perhaps a third of the projectile points.

Form (Table 1, p.130)

The commonest form of projectile point is the stemmed point ($n=16$, 36%; Figs. 3a-c, 4b-c). Three of these have small barbs while there is one stemmed point with incipient barbs. The next most

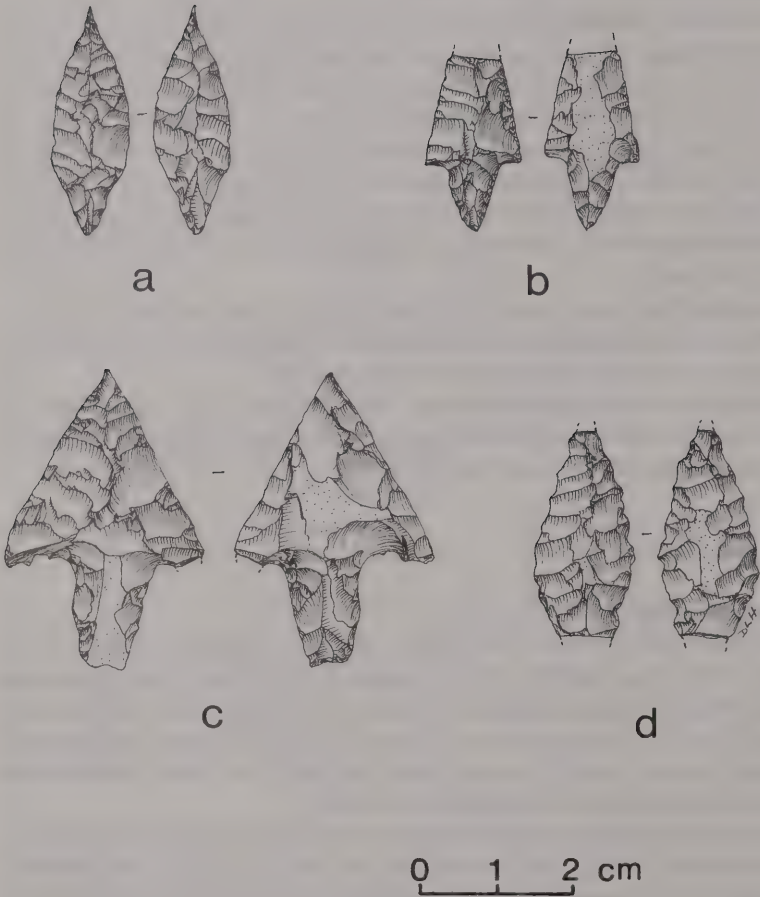


Figure 3. Projectile points from sites in the Umm el-Dabadib area. a-c, stemmed points; d, lens-shaped point; e, transverse projectile point; f, ounanian point; g, concave-base point.

abundant form is lens-shaped or bipointed ($n=10$, 22%; Figs. 3d, 4a). The remaining forms consist of an ounanian type⁴ (Fig. 3f), concave-base (Fig. 3g), transverse (Fig. 3e), irregular/other, and broken pieces of indeterminate form (Table 1). Seven of the stemmed points have a broad triangular stem (Figs. 3a, c, 4b) while the remainder are grouped together in the category 'other' as each stem is unique although not necessarily distinctive. Two stems are broken so their shape is indeterminate. Generally, the projectile points are fairly symmetrical and carefully shaped.

Presence of cortex or other natural surface (Table 1, p.130)

Eighteen (40%) projectile points have no trace of a residual natural surface. Those points which do show an ancient patina rather than a thick cortex. This ancient patina represents a natural secondary deposit on a flint surface rather than the crust or cortex that develops on the outside of a flint nodule while it is still *in situ* in its original geological horizon. Only one projectile point has any true cortex.

Dimensions (Table 2, p.131)

The mean length of the unbroken projectile points is 32.5mm. Their mean width (a measurement taken at mid-length) is 12.5mm, and they have a mean thickness of 2.7mm. Since many pieces have the remains of a natural surface on both sides, the thickness measurement (taken at the centre of each specimen) frequently corresponds to the thickness of the raw material originally selected. The mean length of the stems of the stemmed points is 9.5mm.

Retouch

The distribution of retouch on the projectile points is shown in Table 3 on p.131 (for a summary of retouch terms used, see Holmes, 1989: 450-456). Five stemmed points have marginal retouch. One has normal, non-invasive retouch around most of the periphery of the ventral aspect. The stem has alternate retouch. The other four stemmed points with marginal retouch have invasive retouch. Two have invasive retouch around the entire periphery of one aspect with the base retouched on the other side as well, and additionally, one has small, non-invasive retouch around the tip on the other aspect. Of the other two stemmed points with invasive marginal retouch, one is a basal fragment with bifacial (edge) retouch, and the other has a broken stem with limited direct retouch, and direct retouch around the tip.

The lens-shaped point with marginal retouch has direct retouch around the entire periphery and limited inverse retouch. The transverse projectile point has normal, direct retouch (Fig. 3e). The indeterminate willow-leaf/lens-shaped piece with marginal retouch has essentially bifacial (edge), invasive retouch which extends round the entire periphery of one aspect and most of the periphery of the other side. The irregularly-shaped specimen (on a blade) with edge retouch has irregular direct retouch on both aspects of the distal end and limited direct retouch at the proximal end.

⁴ 'Ounanian' is an expression used by Caton-Thompson (1952: 160-164). In this paper, however, the term has a modified, more specific meaning. An ounanian point may be defined as (Fig. 3f) a point made on a regular blade with a single main dorsal ridge, which is characterized by a slightly constricted base tending towards a triangular shape (but not as regular a triangular form as with many of the stemmed points) that has been shaped by *couvrante* retouch. This may be either bifacial or occur on one aspect only. More limited retouch may be present on the tip.

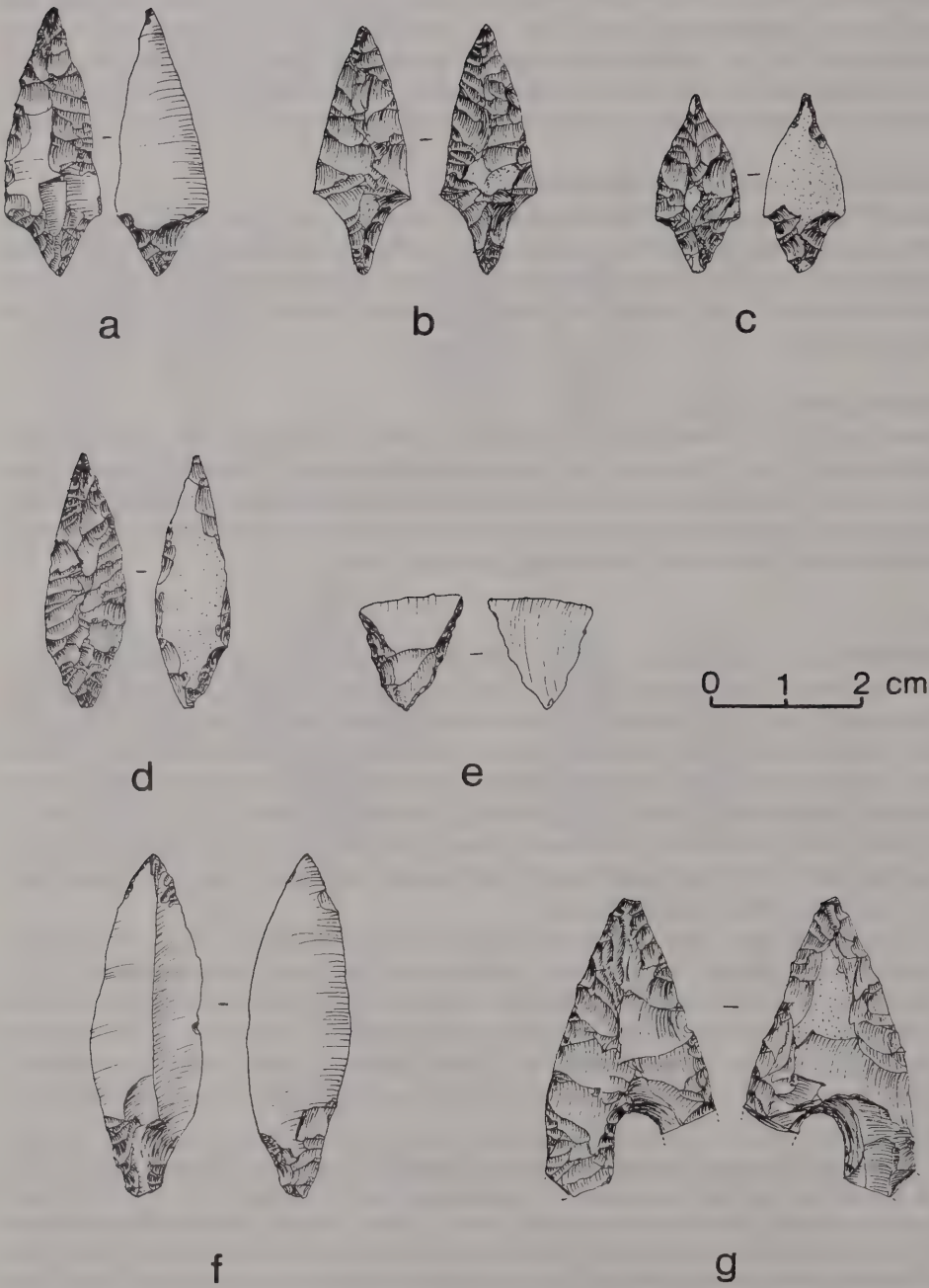


Figure 4. Projectile points from the Umm el-Dabadib area. a, lens-shaped point; b-c, stemmed points; d, broken willow-leaf or lens-shaped point.

The projectile points in the 'predominantly unifacial' and 'predominantly bifacial' categories have *couvrante* collateral retouch. Some remnant natural surface may remain in the centre of an aspect which otherwise has *couvrante* retouch. The 'predominantly unifacial' points are entirely worked on one side while the other aspect may have limited invasive or non-invasive retouch along parts of their lateral margins, and the tips and/or bases may be retouched (e.g. Fig. 3c-d). The 'predominantly bifacial' pieces are those points that have *couvrante* retouch on both aspects (e.g. Figs. 3b, g, 4a, c-d).

Two of the ouanian points are complete specimens with bifacial basal retouch, while the other two are basal fragments with retouch on the ventral aspect of the base only. The two whole points also have limited edge retouch at the tip which, in one case, is bifacial and in the other, direct (Fig. 3f).

Most of the projectile points are essentially unifacial (in the sense of having *couvrante* retouch on one aspect) or bifacial, and there are equal numbers of both. Together, these categories account for 71% of the projectile points.

The form of the retouch ranges from normal, marginal edge retouch through square and elongate invasive forms, to collateral, elongate, subparallel to very regular parallel *couvrante* scars. Some of the regular, parallel, *couvrante* retouch is oblique. Since the projectile points are mainly unifacial or bifacial, most of the retouch is collateral, *couvrante*, elongate, and subparallel to parallel, sometimes oblique, and was almost certainly achieved by pressure flaking.

***Breaks* (Table 4, p.132)**

Just over half of the projectile points have at least one minor break. Since the points come from surface scatters and are not in absolutely pristine condition, it is difficult to ascertain whether all or any of the breaks represent impact fractures. Experiments conducted by Bergman and Newcomer (1983) produced three types of impact fracture: burin-like fractures, flute-like fractures and bending fractures. Only one projectile point from Umm el-Dabadib appears to show a flute-like fracture, i.e. a damage scar on the dorsal or ventral surface, in this case on the ventral aspect. Actually, this flute-like fracture appears to be so minor that the piece has been grouped with the unbroken specimens. The tip breaks (28% of all breaks; Fig. 4b) may represent bending fractures from impact, a bending fracture being a transverse break.

Comparison with Other Projectile Points from Kharga Oasis

As might be expected, the projectile points reported on by Caton-Thompson for the Umm el-Dabadib area (Caton-Thompson, 1952: pl. 99) are essentially identical to those from the more recent fieldwork. They include ouanian forms (idem: pl. 99 [2, 4-5]), lens-shaped unifacial pieces (idem: pl. 99 [7-8, 17-19]), and stemmed points (idem: pl. 99 [9-10]), but also illustrated are three triangular points (idem: pl. 99 [14-16]), a form not encountered among the projectile points from the recent field investigations.

There are arrowheads known from 'Bedouin Microlithic' surface localities in the Ghuata Basin, including lens-shaped specimens (idem: pl. 95 [15-16]). From Gala Hill there are some transverse arrowheads (idem: pl. 96 [8-11]) which are of a different form from the one example from Umm el-Dabadib. The Gala Hill specimens have concave margins so the tip edge splays out. A number of projectile points similar to examples from Umm el-Dabadib are known from Yebesa Pass, the Libyan Plateau Silt Pans, and Abu Sighawal Pass (idem: pls 97 and 98 [2]). Caton-

Thompson (idem: pl. 100 [7-10]) shows three stemmed points and a lens-shaped point from the surface at mound-spring area KO5, and a stemmed and a concave-base point from the surface of other mound spring areas are also figured (idem: pl. 111 [9-10]). All these points resemble specimens from Umm el-Dabadib.

Wendorf and Schild (1980: 188-203) did not report any projectile points from their 'Terminal Palaeolithic' and 'Neolithic' sites. However, a few were noted from several Terminal Palaeolithic and Neolithic occurrences by Simmons and Mandel (1986: 186, 190-191). Many of the sites they recorded are multicomponent localities, though they suggest that 'the Terminal Palaeolithic and the Neolithic may, in fact, be closely related and should perhaps be considered as the same cultural period', and that 'Thus, separation of Terminal Palaeolithic and Neolithic components may be somewhat spurious' (Simmons and Mandel, 1986: 79). Therefore, the sites they ascribe to these periods may be regarded as post-Palaeolithic. The projectile point examples from these sites which they describe and illustrate amount to only about a dozen which consist of lens-shaped, stemmed and irregular specimens, all of which would not seem out of place in an Umm el-Dabadib assemblage.

Thus, on the whole, the projectile points from Kharga Oasis belong to the same range of forms and styles. Essentially they belong to a single stone tool tradition, though it has been noted that the Kharga post-Palaeolithic may be divided into two developmental phases, an earlier and a later (Hassan and Holmes, 1985; Holmes, 1987a; 1989: 355). However, Caton-Thompson always assigns concave-base points to the Peasant Neolithic since she found four at the Peasant Neolithic site mound-spring KO5 (Caton-Thompson, 1952: 185). The remaining 7 of the total of 11 concave-base points she records for the whole of her work in Kharga Oasis are from site KO15 at Umm el-Dabadib. Since the 1983 fieldwork indicated that the lithic assemblages from Umm el-Dabadib are not mixed Bedouin Microlithic and Peasant Neolithic, but rather represent a single earlier post-Palaeolithic tradition, it would appear that concave-base points are not so restricted in time or industry. Caton-Thompson's Peasant Neolithic roughly corresponds to the later post-Palaeolithic. Incidentally, one may note an inconsistency in Caton-Thompson's monograph. While in the text (Caton-Thompson, 1952: 185) she states that only 11 concave-base points were found, 4 from site KO5 and 7 from KO15, plate 111 no. 9 shows a concave-base point supposedly from mound-spring area KO6 or mound-spring area KO8. Perhaps the caption from plate 111 is published erroneously.

Comparison with Projectile Points from Neighbouring Regions

Dakhla Oasis

Projectile points are known from three different early to middle Holocene industries in the nearby oasis of Dakhla. These are the Masara, Bashendi and Sheikh Muftah industries (McDonald, 1985; 1986; in press). The Masara is the earliest and is associated with radiocarbon dates ranging from ca. 8100 to 8800 bp though centred on ca. 8700 bp (Brookes, 1989). There are two variants of the Masara unit: Variants A and B. The lithic artifacts of Variant B consist largely of reworked Palaeolithic items and do not include any arrowheads, so this variant need not be considered any further. A few projectile points, on the other hand, do occur in the Masara Variant A which is essentially a blade and bladelet industry, but it shares only a very limited number of features with the Umm el-Dabadib assemblages. The arrowheads comprise a few Ounan points made on bladelets which McDonald (1985; in press) describes as having proximal stems shaped by steep,

direct retouch. The retouch, as described, does not appear to correspond to the kind observed on the ouanian points from Umm el-Dabadib (cf. definition in note 4), and the one illustration provided (McDonald, 1986: pl. VII.2) certainly shows an Ounan point rather than an ouanian form. One Masara A site also yielded a stemmed point with ventral edge retouch and a completely retouched dorsal aspect (McDonald, 1986), but with no further description or illustration it is difficult to assess this piece.

A series of C¹⁴ dates places the Bashendi industry in the interval between ca. 6200 and 5100 bp (McDonald, 1985), which would make it essentially younger than the Umm el-Dabadib industry. However, there are a few radiocarbon determinations which, if their contextual association is correct, would indicate that the Bashendi unit goes back to at least the middle of the 8th millennium bp (Brookes, 1989). In any case, it almost certainly overlaps in time, at least to some extent, with the Umm el-Dabadib industry, and the two appear to be closely related. The most noticeable difference between them seems to be the occasional presence of pottery at some Bashendi sites, though it should be noted that a total of only 14 sites have been visited in the Umm el-Dabadib region compared with more than 30 Bashendi sites in Dakhla Oasis, some of which have been intensively investigated.

The similarities seen between the two industries also extend to the projectile points in terms of both frequency and type. Site 30/450-F8-3 in Dakhla, for example, which has yielded the largest Bashendi tool assemblage (199 tools), has produced 54 projectile points (27% of the tools; McDonald, 1985; in press).

Altogether, McDonald (1982: 127; 1985; 1986; in press) has noted a dozen projectile point types from Bashendi sites. These are:

- (1) arrowheads with edge retouch made on blades with the retouch occurring at the proximal and distal ends (these include Ounan points);
- (2) bipointed projectiles with fine retouch covering much of one or both faces (lens-shaped points with *couvrante* retouch);
- (3) bifacially retouched points with flat (snapped) bases (these would seem to be broken lens-shaped specimens);
- (4) bifacially retouched tanged projectile points (stemmed points with *couvrante* retouch);
- (5) tanged and winged bifacially retouched points (stemmed points with barbs and *couvrante* retouch);
- (6) points on bladelets with well-defined, bifacially retouched tangs but otherwise modified, at most, by unifacial edge retouch (could some of these correspond to the ouanian form recognized for Umm el-Dabadib?);
- (7) small triangular points with some edge retouch and proximal concave truncation (Bou Saâda points);
- (8) asymmetrical points shaped by retouch (these points, not illustrated by McDonald, probably correspond to some examples in the irregular/other category of the Umm el-Dabadib points);

(9) bipoints made in bladelets with some bifacial edge retouch at one or both ends (i.e. lens-shaped points made with marginal retouch);

(10) hollow-based points (i.e. concave-base points);

(11) diamond-shaped bifacial points (no illustration is provided. Could they be short, squat lens-shaped points?);

(12) large, roughly bifacially retouched points (these have no counterpart at Umm el-Dabadib);

There is, thus, a wide range of projectile forms from the Dakhla Bashendi sites. Nos. 1, 2, 4, 5, and 7 (this numbering has been arbitrarily applied by the present writer and not McDonald) above are the principal types. These are all forms which occur among the Umm el-Dabadib points except for no. 7, the Bou Saâda points. However, three points shown by Caton-Thompson (1952: pl. 99 [14-16], and p. 158) which are from Umm el-Dabadib, are perhaps representative of this type. Also, some of the tanged points from Dakhla appear somewhat different in outline from the bifacially retouched stemmed points from Umm el-Dabadib, though parallels for at least some of these are to be found at Peasant Neolithic (i.e. later Post-Palaeolithic) sites in Kharga (Caton-Thompson, 1952: pls. 100 [10], 111 [10]). The Dakhla tanged points also include a variety from one site having a three-pointed tang (McDonald, 1983: 162, pl. XIIIa) which has not been reported for Kharga.

The remaining classes of projectile points noted for Dakhla are also to be found among the Umm el-Dabadib specimens except for no. 12 and perhaps no. 11, though as the comment above suggests, these 'diamond' forms could fit in with some of the Kharga lens-shaped examples. One may also note that there is one type of projectile point from Kharga which has so far not been encountered in Dakhla: the transverse point.

The Sheikh Muftah industry appears to mostly follow on from the Bashendi unit. However, its beginning and end are not firmly dated. It would seem that it goes back to at least ca. 5200 bp and possibly overlaps with the end of the Bashendi tradition, and it appears to continue into at least Old Kingdom times (McDonald, 1986; in press). It shares a number of similarities with the later post-Palaeolithic in Kharga rather than the earlier Umm el-Dabadib industry.

Sheikh Muftah assemblages generally contain fewer projectile points than Bashendi sites with the percentage never exceeding 10% of the tools, and the types of point present are far more restricted (McDonald, in press). The most common variety consists of carefully retouched bifacial tanged specimens, some having barbs or serrated edges. Large, roughly retouched bifacial points are also present (McDonald, 1982; in press).

Great Sand Sea: Lobo

Moving now to consider areas in the northern part of the Western Desert, we come first to the Great Sand Sea. One locality here, Lobo, situated near Bir Abu Minqar at the eastern margin of the Great Sand Sea, has produced lens-shaped points with collateral, oblique subparallel to parallel *couvrante* retouch that look identical to those from Umm el-Dabadib (Klees, 1989). In addition, there are some stemmed points on blades and transverse arrowheads. These types are associated with at least two occupation phases at the site dating to ca. 7800 and 6100 bp.

Farafra Oasis

Preliminary investigations recently undertaken in Farafra Oasis suggest that there are at least two post-Palaeolithic occupational phases, one dating to the early mid-Holocene (with C^{14} dates of 6950 ± 60 bp (R-1894) and 6670 ± 95 bp (R-1895) obtained from two sites), and the other to a mid-Holocene moist phase ascribed by Hassan to ca. 5900-5000 bp (Barich and Hassan, 1984-87). So far, only small assemblages have been reported. However, three sites (FA VII/A, Bahr Playa, and XIII/B near Ain Dalla) of the second phase have each yielded a single projectile point. All three are lens-shaped specimens not dissimilar to examples from Kharga.

Siwa Oasis

To the west of the Qattara Depression is Siwa Oasis where there is a series of post-Palaeolithic occurrences dated ca. 8800-6800 bp (Hassan, 1976; 1978a; Hassan and Gross, 1987). Hassan's investigations in the area yielded a total of 20 projectile points, and to these can probably be added the arrowheads in the collections from the area made by Willett-Cunnington which were studied by McBurney (1955). These two series of arrowheads include bifacially retouched lens-shaped points and ouanian points which are similar to those from Kharga. However, there are also various other forms which do not compare with any known Kharga examples. These include bifacially worked leaf-shaped points with round bases and bifacial tanged points which are generally narrower and more elongate than any of the stemmed points from the Kharga area. Also there are no concave-base points.

Baharia Oasis

Only a few projectile points are known from post-Palaeolithic sites in Baharia Oasis which date to ca. 7000 bp (Hassan, 1978b; 1979). They consist of small stemmed points on flakes and blades with limited marginal retouch, and as such, are comparable to some specimens from Kharga.

Fayum Depression

The Fayum is often included with the Nile Valley yet, in many ways, it is still a desert oasis and so may be included here. Huge numbers of projectile points have been collected from the Fayum, particularly by the indefatigable collector, Seton-Karr (1904). It seems likely that all, or at least the majority are from the Neolithic, but only those projectile points from known contexts will be considered here. As it happens, all the datable arrowheads do belong to the Neolithic (ca. 6400-5100 bp; Hassan 1985).

Caton-Thompson and Gardner (1934) found many projectile points during the course of their work. Most of the specimens they depict are bifacial concave-base and stemmed forms (including examples with barbs). They also show a few lens-shaped points (Caton-Thompson and Gardner, 1934: pl. LI [30, 33-34]). Yet despite all the variety only very few Fayum examples resemble any of the projectile points from Umm el-Dabadib. Conceivably the concave-base points shown in plates XXXIX no. 5 and XLII no. 10 could be analogues for the two concave-base specimens from Umm el-Dabadib, but the barbs of the latter are broken. Caton-Thompson (1952: 185) observed that most of the concave-base forms in Kharga have square-ended barbs (while not saying what the remaining shapes were, possibly because the rest of her specimens had broken barbs, this part of the tool being prone to breakage). This is likely to have been the kind of barb shape which the examples from Umm el-Dabadib possessed (Caton-Thompson, 1952: pl. 111 [9]), and is the kind

of point shown from the Fayum (Caton-Thompson and Gardner, 1934: pls XXXIX [5], XLII [10]).

Another possible Fayum Neolithic parallel comes from the more recent investigations of Wenke *et al* (1988: Fig. 5, concave-base arrowhead depicted in second row from the bottom). However, little importance need be attached to these resemblances since there is seemingly an almost infinite variety of concave-base forms from the Fayum, so it is not surprising that two or three resemble the main form from Kharga.

Desert plateau east of the Kharga Depression

Moving southwards from the Fayum, we come to a locality on the desert plateau, east of Kharga Oasis, where Caton-Thompson found several lens-shaped points similar to specimens from Umm el-Dabadib and elsewhere in the Kharga Depression, as well as an elongated point of a form not encountered in Kharga (Caton-Thompson, 1931). Caton-Thompson saw similarities between the lens-shaped points from the plateau and some lens-shaped examples from the Badari district in the Nile Valley (Brunton and Caton-Thompson, 1928: 37, pl. XXIX [6]). However, while there is a resemblance in the shape of the points, there seem to be differences in the style of the retouch.

Dungul Oasis

A few projectile points occur in the assemblages representing the Libyan industry of the Dungul area, which is associated with a C^{14} date of 7900 ± 150 bp (Hester and Hobler, 1969). The points consist of two transverse points (idem: 87-88, Fig. 98b, e), a bifacially retouched stemmed point (idem: 88, Fig. 98d), and two stemmed points made on blades with the edge retouch mainly restricted to the stem (idem: 88, Fig. 98c, f). Hester and Hobler (1969: 90) also indicate four bifacial points in their table and show photographs of three of them (idem: Fig. 102 a-c). They state that the 'preferred form is the laurel leaf, pointed at both ends' (idem: 95). However, the points shown appear to comprise one normal lens-shaped specimen (idem: Fig. 102a), a larger somewhat asymmetric bipointed form (idem: Fig. 102c), and what appears to be probably a bifacial stemmed point with a broken stem (idem: Fig. 102b). There are no concave-base points. The bifacial stemmed points do not closely resemble any examples from Kharga Oasis, but the other points are within range of types encountered in Kharga.

Nabta and Bir Kiseiba regions

A number of projectile forms have been encountered at sites in the Nabta and Bir Kiseiba regions in the southern part of the Western Desert (the actual locales of Nabta Playa and Bir Kiseiba are about 85km apart) which span a considerable period of time, from ca. 9800 to around 5000 bp. The excavators refer to these localities as 'Neolithic', and apparently rightly so, as there are indications that domestic cattle were kept in the area from the mid-10th millennium bp onwards (Wendorf and Schild, 1980; Wendorf *et al*, 1984). Wendorf and Schild's (1984) terminology is thus retained in the following discussion.

There is essentially just one class of projectile point described by Wendorf and co-workers for their Early Neolithic (ca. 9800-8000 bp) which they term an 'Ounan-Harif point', though there are also occasional trapezes and rare examples of triangles which might conceivably have served as transverse projectiles (e.g. Wendorf and Schild, 1980: 112 [Fig. 3.39k], 117 [Fig. 3.45c-f]; Close, 1984a: 274 [Fig. 12.10g-j]). The Early Neolithic assemblages often also contain La Mouillah points, but these seem unlikely to have been used as any kind of projectile. Three bifacial points came from site E-77-3 in El Kortein Playa near Nabta but Wendorf and Schild (1980: 110)

dismiss them as 'obvious Neolithic' (i.e. Middle or Late Neolithic in their 1984 terminology) intrusions, apparently simply because they subscribe to the idea that bifacial points do not occur in the 'Early Neolithic' (Wendorf *et al* 1984 terminology; or 'Terminal Palaeolithic' in the 1980 publication).

The definition of an Ounan-Harif point used by Wendorf and colleagues seems a fairly broad one. The Early Neolithic specimens consist of points made on flakes, blades and bladelets that have a base retouched into a broad triangular shape or a short (usually) stem, and one lateral edge that is backed or partially backed or shows truncation retouch near the point tip (Wendorf and Schild, 1980: 110, 112 [Fig. 3.39v-cc], 113 [Fig. 3.40c], 117 [Fig. 3.45k-p], 141 [Fig. 3.78l-m]; Wieckowska, 1984: 88 [Fig. 5.8i-k], 90; Close, 1984a: 276-278, 277 [Fig. 12.11a-k], 290 [Fig. 12.17d], 291; Close, 1984b: 321, 322 [Fig. 14.5a-b]). The basal retouch normally consists of abrupt edge retouch that may be direct, inverse or bifacial, but in some cases the retouch on the ventral aspect is invasive. The average dimensions cited for these points are (length x width x thickness): 27.9 x 13.1 x 3.0 mm for the 62 points from E-80-1 Area A and 28.3 x 11.4 x 3.2 mm for 5 specimens from E-80-3 (Close, 1984a: 277; 1984b: 321).

Wendorf and Schild (1984) consider Ounan-Harif points to be characteristic of their Early Neolithic of el Kortein type, though there are occasional examples in the other Early Neolithic variants (e.g. 5 specimens from the el Nabta variant site E-80-3 in the Kiseiba region [Close, 1984b: 315, 321]). In the el Kortein variant sites, the percentage of Ounan-Harif points in the tool assemblages varies from 3.2% (E-79-1) to 28.2% (E-80-1 Area A).

As Wendorf and Schild (1984) conclude, the Early Neolithic Nabta and Bir Kiseiba projectile points resemble Harif points known from the Negev (cf. Bar-Yosef, 1975; Marks, 1973; Marks and Scott, 1976; Phillips, 1977; Goring-Morris, 1987: 316-371) more than they do Ounan points from the Maghreb (cf. Tixier, 1963: 148-150). The Negev specimens occur in the Harifian industry which is dated between ca. 10,700 and 10,000 bp (Goring-Morris, 1987: 316). However, the Harifian points seem generally smaller than the Ounan-Harif points of Nabta/Bir Kiseiba (see above). Marks (1973) cites an average length of 23.4 mm for the Harif points from Abu Salem, while Goring-Morris (1987: 355) lists the average length and width for the Harif points (and other related specimens) from a number of different sites, ranging from 19.2 to 27.1 mm (length) and 8.7 to 10.3 mm (width).

There seem to be only a few similarities with some of the marginally retouched stemmed points from Kharga (e.g. Caton-Thompson, 1952: pl. 97 [8, 21]; Simmons and Mandel, 1986: 191 [Fig. 27b]), and the latter examples all come from localities on the Yebsa plateau in northern Kharga.

A variety of projectile point forms appear with the Middle Neolithic (ca. 7700-6200 bp) of the Nabta and Bir Kiseiba regions. La Mouillah points no longer occur and the Ounan-Harif forms are replaced by edge-retouched points having generally larger, more pronounced stems that join the projectile body with large concavities (e.g. Wendorf and Schild, 1980: 146 [Fig. 3.87g]; Banks, 1984a: 106, 110 [Fig. 6.8f-g]; confusingly, Banks continues to use the term 'Ounan').

Other types to appear in the Middle Neolithic are an assortment of bifacial forms, and a range of truncated points made on flakes and sometimes blades or bladelets. The truncated points are generally small with convex, concave or straight retouched bases, and at least one lateral edge is often retouched with minimal light retouch at the tip, or with more continuous retouch which may appear as a kind of backing (Wendorf and Schild, 1980: 151, 155 [Fig. 3.97d-l]; Wendorf and

Close, 1984: 203 [Fig. 10.6i-m], 205 [Fig. 10.7r-t], 209 [Fig. 10.9l]). The plan form of these points is frequently triangular, and Wendorf and Close (1984: 200, 210) term many of them 'truncated triangular points' and 'backed and truncated triangular points' (Banks [1984b: 157] refers to them as 'unifacial and proximally truncated points'). The examples with concave bases are referred to as Bou Saâda points (e.g. Banks, 1984a: 110 [Fig. 6.8e]; Wendorf and Close, 1984: 205 [Fig. 10.7t]), while some of those with convex bases are considered to resemble pointed bladelets with rounded bases (Type 109 of Tixier [1963: 152]). In many ways, the backed and truncated triangular points resemble Columnata points (Tixier's type 110; Tixier, 1963: 151-153) except the bases are shaped by direct retouch rather than bifacial retouch as is characteristic of the Maghrebian specimens.

The 'truncated triangular points' from site E-79-6 (Gebel el Feel playa 25 km south of Bir Kiseiba) vary in length between 13 and 25 mm (average: 18.7 mm), while their widths range from 10 to 18 mm (average 14.6 mm) and their thicknesses from 2 to 4 mm (Wendorf and Close, 1984: 210). The dimensions of the 'backed and truncated triangular points' from E-79-6 vary between 13 and 21 mm (length), 9 and 14 mm (width) and 2 and 5 mm (thickness; averages are not given) (Wendorf and Close, 1984: 210). These sets of values are comparable to the figures provided by Banks (1984b: 157) for 28 (25 unbroken) 'unifacial and proximally truncated points' from the Middle Neolithic levels at E-75-8 (Nabta Playa): mean length 19.1 mm (range: 12-32 mm), mean width 12.0 mm (range: 8-21 mm), and mean thickness 2.6 mm (range: 1-5 mm). However, except for three straight to slightly concave-based specimens from Umm el-Dabadib (Caton-Thompson, 1952: 158, pl. 99 [14-16]), there are no other parallels for these various forms of small triangular point from Kharga Oasis.

There are only a few bifacial points from the Middle Neolithic at Nabta and Bir Kiseiba and few of these are illustrated (Wendorf *et al*, 1976: Fig. 6g; Wendorf and Schild, 1980: 129 [Fig. 3.58o]⁵; Banks, 1984b: 158 [Fig. V:24f-h]) so it is difficult to assess to what extent there are any resemblances with the various bifacial forms from Kharga. Several bifacial points have been found at site E-75-8 in Nabta Playa. Wendorf and Schild (1980: 157) mention two bifacial points from the 'Connecting Trench' and a bifacial point fragment from Pit 75/4. An illustration of another bifacial point from E-75-8 appears in the 1976 Wendorf *et al* article (Fig. 6g). The piece is broken but it may have been a lens-shaped point. Wendorf and Schild (1980: 154) also note that bifacial points account for 2.0% of the tools from the lower cultural level at E-75-8 and describe them as 'small, elongated willow-leaf or lozenge-shaped arrowheads; and barbed and tanged arrowheads with convergent stems'. Banks subsequently re-evaluated the lithic artifacts from the Middle (and Late) Neolithic levels, and provides a more detailed description of all the projectile points (including the 28 truncated triangular points mentioned above; Banks, 1984b: 148, 157-159). He reports a total of 8 bifacial points for the Middle Neolithic assemblage from E-75-8: 6-leaf-shaped and 2 stemmed points. However, not all of his leaf-shaped category have *couvrante* bifacial retouch. The illustrated examples show a bipointed arrowhead shaped by marginal retouch, a broken projectile point which seems to have had some invasive retouch at the proximal end, a bifacial bipointed specimen which is the only possible parallel for any Kharga point, and a large bifacial tool (Banks, 1984b: 158 [Fig. V:24d-f, i]). The two bifacial stemmed points are both barbed. One is rather elongate in shape, while the other is broader and has serrations just above the barbs (Banks 1984b: 158 [Fig. V: 24g-h]).

⁵ It is not entirely certain whether this point (from site E-75-7) belongs to the Middle Neolithic.

The only bifacial points (except for a concave-base point discussed below) reported for the Middle Neolithic in the Bir Kiseiba area are three specimens from Bir Murr I. This is actually located about 60 km north of the Kiseiba escarpment, and though it is dated to 6310 ± 70 bp (SMU-1120), Wendorf *et al* (Connor, 1984: 391; Wendorf and Schild 1984: 416) hesitate between placing it in their Middle Neolithic and their Late Neolithic. The three bifacial points consist of a 'shouldered and tanged' specimen, one that is 'ovoid in shape with a rounded distal "point" ' and a point that is described as 'convex triangular in shape, completely bifacial, shouldered and tanged' (Connor, 1984, 396-397). The tang of the latter is at a 30° angle to the rest of the tool, and Connor suggests that it might not in fact have served as a projectile.

Several bifacial concave-base points have also been found in the Nabta area. Although not illustrated, they are described as being similar to concave-base points from the Fayum (Wendorf *et al*, 1976: 112). A single bifacial concave-base point has been found at a site (E-79-6) in Gebel el Feel playa in the vicinity of Bir Kiseiba (Wendorf and Close, 1984: 202 [Fig. 10.5e], 210). It is of somewhat irregular form but has essentially square-ended barbs which might suggest some relationship with the known concave-base specimens from Kharga.

Trapezes are relatively rare but it is possible that some at least served as projectile points (e.g. Wendorf and Schild, 1980: Figs. 3.58d-e, 3.78g, 3.97w). A piece from site E-75-8 (Wendorf *et al*, 1976: Fig. 6h) is referred to as a 'transverse arrowhead'.

Only one assemblage from Nabta Playa is assigned to the Late Neolithic (ca. 6200/6000 - after 5800 bp). This is from the upper cultural horizon at site E-75-8 which is sandwiched between levels dated to 6310 ± 90 (SMU-441) and 5810 ± 80 bp (SMU-473; Wendorf and Schild, 1980: 160) suggesting that the site was used ca. 6200-6000 bp (Wendorf and Schild, 1984: 418). The assemblage contains only a small number of tools which include a truncated triangular point and an arrowhead stem fragment (Banks, 1984b: 185; Wendorf and Schild [1980: 161], however, only mention a bifacial point).

There are also only a few (four) Late Neolithic sites in the Kiseiba region, and three of these have yielded tool collections consisting of less than 100 tools. The fourth site, Bir Murr II, produced 170 tools. It is not altogether surprising, therefore, that only two projectile points occur in these Kiseiba collections (one from E-79-4 level V, the other from Bir Murr II). Both are bifacial. One is referred to as a 'tanged arrowhead' (Kobusiewicz, 1984: 155); the other is described as 'an elongated triangle with convex sides' but the original shape of the complete point is uncertain because the base is broken (Connor, 1984: 402). There is no drawing of either artifact.

Overall, it may be said that the projectile points from the Nabta and Bir Kiseiba regions do not show very many similarities with any of the known specimens from the Kharga Depression. There is no comparable series of Ounan-Harif points from Kharga, and the Nabta/Kiseiba areas do not seem to have yielded such a wealth of bifacial forms. The small truncated triangular points also seem characteristic of Nabta/Bir Kiseiba. The bifacial concave-base points from Nabta and Bir Kiseiba might hint at some general relationship with Kharga but not any close link. The same might also be said for the Nabta/Kiseiba Middle Neolithic stemmed points and conceivably for some, at least, of the bifacial points.

Gilf Kebir

Many post-Palaeolithic sites are now known from the Gilf Kebir in southwestern Egypt (McHugh, 1975; Wendorf and Schild, 1980: 217-221; Kuper, 1981; Schön, 1989). However, the

assemblages tend to include a high proportion of blades and bladelets as well as at least a few microlithic tools, and the only projectile points are generally transverse specimens made on bladelets. For example, site 80/14 in the Wadi el Akhdar produced more than 30 small transverse specimens having a maximum width of between 6 and 10 mm (Kuper, 1981).

Moving farther south, the post-Palaeolithic industries are essentially microlithic with the only recognizable projectile points consisting of transverse specimens which occur only very rarely in Kharga (e.g. Rahib Wells 80/73 in Wadi Howar [Kuper, 1981]).

Comparison with Projectile Points from Sinai and the Negev

The early Holocene industries of the Sinai and Negev feature a wide variety of projectile forms. However, with the possible exception of the Harif points of the Harifian, there seem to be no evident similarities with any of the projectile point types of the Western Desert (cf. remarks on Ounan-Harif points in the section on the Nabta and Bir Kiseiba regions).

While projectile points are common in the Pre-Pottery Neolithic B (approx. 9500/9300-8000/7800 bp) and earlier (see for example Burian *et al*, 1976; Bar-Yosef, 1981a; Mintz and Ben-Ami, 1977; Servello, 1976), they are rare in the Chalcolithic (approx. 5700/5500-4400/4300 bp), while the Pottery Neolithic (approx 8000/7800-5700/5500 bp) of the Sinai and Negev is poorly known. A few projectile points come from the Pottery Neolithic site of Qadeš Barnea' 3 (Bar-Yosef, 1981a). They are small and have been shaped by pressure flaking into tanged and leaf-shaped forms, but again they show no hint of a relationship with the projectile points of the Egyptian Western Desert, but rather possibly a derivation from Pre-Pottery Neolithic B types.

There are a few sites that are generally considered to be very late Neolithic which have yielded modest to high frequencies of projectile points (Rosen, 1987). These include Kvish Harif in the central Negev, which aside from numerous transverse points also produced four small, bifacial projectile points: 2 Herzliya points (a bipointed shape) and 2 Nizzanim points (a stemmed form; cf. Bar-Yosef, 1981b for point types) (Rosen, 1984). A charcoal sample from Kvish Harif yielded a date of 5269 ± 60 bp (PTA 3374). The site of Gunna 50 in southern Sinai has also produced fairly numerous projectile points (Bar-Yosef *et al*, 1986). Mostly they consist of transverse specimens, but there are also a few pressure-flaked examples six of which can be classed as Haparsah points which are regarded as a late Neolithic type.

For the Chalcolithic, Hanbury-Tenison (1986: 145) states that transverse points are 'a feature of the Sinai and the Negev' and have 'been found on several sites between Qatif and el-Arish'. He also points out that examples have been found in the *nawamis* of southern Sinai (Hanbury-Tenison, 1986: 145; Bar-Yosef *et al*, 1977). Nevertheless, there are many important Chalcolithic sites, such as Tell Abu Matar, Horvat Beter and Shiqmim (Perrot, 1955; Yeivin, 1959; Levy and Rosen, 1987), that have yielded no projectile points at all. It may also be noted that only five projectile points have been reported for the Ghassulian Chalcolithic 'type-site' Teleilat Ghassul in the southern Levant. They are all stemmed points made on long blades (Neuville, 1934).

There is a bifacial concave-base point from the Early Bronze I site 'H' at Shellal Bridge in the Negev (MacDonald *et al*, 1932: 13, pls. XX [15], XXIII [31]; Roshwalb, 1981: 285) which looks very much like a Predynastic example; which it probably is, being an import from the Nile Valley. During the late Chalcolithic and the beginning of the Early Bronze Age many Egyptian objects made their way into the Sinai and Negev (see for example, Amiran, 1965; 1969; 1974; Brandl, 1989; Gophna, 1976a; 1976b; 1980; Gophna and Gazit, 1985; Oren, 1973; Oren and Gilead, 1981;

Porat, 1986/87; Yeivin, 1960). This might have been through trade during the late Predynastic, but the abundance of Egyptian pottery and other finds dating to the 1st Dynasty in northern Sinai and the Negev suggests subsequent Egyptian occupation (Gophna, 1976b; 1976c; 1980; Gophna and Gazit, 1985) and possibly political domination of the area (see for example, Yadin, 1955; Yeivin, 1960; Oren, 1973). Indeed, it is beginning to look as though southern Palestine had effectively become an extension of Egypt during the Early Bronze Age I (Porat, 1986/87).

Comparison with projectile points from the Delta and the Egyptian Nile Valley

A few bifacial arrowheads are known from the Final Palaeolithic Helwan industry (e.g. Browne, 1878: pl. IX [2]; Cowper, 1911: Fig. III [68]) but none correspond to any Kharga types, nor are there any parallels to be found in the highly microlithic Elkabian industry dating from ca. 8000 bp. There are three Ounan points (Vermeersch, 1978: 62 [Fig. 33: 25-26], 91 [Fig. 45:5], table 7) but they do not bear a close resemblance to any Kharga specimens.

There are also generally very few projectile points from Neolithic and Predynastic sites in the Delta and Nile Valley, presumably because hunting was no longer a major subsistence activity. Nevertheless, the Neolithic settlement locality of Merimde Beni Salâme in the Delta has produced quite a large number of concave-base arrowheads and occasional stemmed bifacial points (Junker, 1928; 1929; 1932; Eiwanger, 1979a; 1979b; 1988). The concave-base points from phase IV at Merimde compare with the known examples from Kharga in that they generally have broad, square-ended barbs, but the Merimde specimens are not exact parallels, rather they probably indicate a more general relationship with Western Desert forms.

Several concave-base points are also known from El Omari (Debono and Mortensen, 1990: 42 [Fig. 6.16-18], 44, pls. 16.6 & 8, 17.1-6, 23.30, 48.1-3). These compare with specimens from the later phases (IV and V) at Merimde (Eiwanger, 1979b) to which they are probably related.

Very few lithic projectile points are known from the younger site of Maadi (calibrated C¹⁴ dates range between 3985 and 3515 BC [Rizkana and Seeher, 1989: 82]). There are three basic forms: stemmed (bifacial), concave-base, and transverse (Rizkana and Seeher, 1988: 32-34, pl. 68). The bifacial stemmed points seem totally unrelated to any Western Desert or Predynastic forms but rather, are similar to tanged arrowheads from Early Dynastic tombs at Abydos (idem: 33), and it has been suggested that the Maadi specimens are intrusive or belong to a later component of the site (Schmidt, 1988). The concave-base arrowheads (6 specimens) are a mixed group, sharing perhaps some affinity with Merimde examples but not those of Kharga. The three transverse projectiles are trapezoidal in shape. Very few such points are known from Kharga, and except perhaps for the splayed form (Caton-Thompson, 1952: pl. 96 [8-11]), it is difficult to identify similarities between limited numbers of this kind of projectile point from different localities. Although hunting was not an important activity, another reason for the rarity of lithic arrowheads at Maadi may have been the use of catfish pectoral-fin spikes (of *Synodontis*) instead, which have been found in large groups at the site (Rizkana and Seeher, 1988: 32).

A burnt and broken concave-base point from the Delta site, Tell el-Fara'in (Buto) may also be mentioned here (Schmidt, pers. comm.). Although it comes from a level roughly contemporary with Maadi, Schmidt thinks it may derive from an older, unexcavated level comparable in age to Merimde.

Projectile points from Predynastic sites in Upper Egypt also consist mostly of concave-base forms. However, very few can be compared with known Kharga examples. The Predynastic

specimens are generally more finely worked and commonly either have incurving, tapering, pointed or ogival barbs (e.g. Brunton and Caton-Thompson, 1928: pls. XXVI, XXVII [5], XXIX [3, 5-6], LVI [1-2]; Brunton, 1937: pls. XXVII [128, 134-136], XXVIII [12, 15, 18-21]; Brunton, 1948: pl. VI [14-15]), or are of a more elongate triangular shape (cf. basic type in Holmes, 1989: 415 [Fig. A.11f], 416; e.g. Brunton and Caton-Thompson, 1928: pls. XXIX [3], LVIII [5], LXXXIII [166A]; Holmes, 1989: 165 [Fig. 5.19b]; Garstang, 1903: pl. III; also a specimen from HK-29A at Hierakonpolis, personal observation).

Other types of arrowhead are considerably rarer. There are four lens-shaped points from the Badari region (Brunton and Caton-Thompson, 1928: pl. XXIX [6]) which have already been commented on above.

Transverse arrowheads are known from Abusir el-Meleq (3 specimens, Scharff, 1926: 48, pl. 30), and Nagada (2 specimens, Hays and Hassan 1976), but by far the greatest number comes from Hierakonpolis—17 from the cemetery locality, HK-6 (Hoffman, 1982: 51, 53), 4 from the settlement locality, HK-29 (Holmes, 1989: 299 [Fig. 8.3c], 305) and 10 from a Gerzean temple-workshop complex, HK-29A (Holmes, 1987b).

Single examples of stemmed points are known from a Badarian settlement and a later Predynastic cemetery in the Badari region (Brunton and Caton-Thompson, 1928: pl. XXIX [3, 5]), an early Predynastic occupation site, Maghara 2, near Dendera (Hendrickx and Midant-Reynes, 1988: pl. V.4), the Predynastic settlements behind the Temple of Seti at Abydos (Peet, 1914: pl. III [a2]), Cemetery U at Hu (Petrie, 1901: pl. VII [U397]), and a Nagada cemetery (Petrie and Quibell, 1896: pl. LXXIII [69]), while so far, 4 barbed and stemmed arrowheads have been reported from HK-29A at Hierakonpolis (Holmes, 1987b).

In general, however, the Nile Valley projectile points do not share any close resemblances with specimens from Kharga Oasis.

Projectile Points of the Eastern Desert

The prehistory of the Eastern Desert is scarcely known at all except for some rock art (e.g. Winkler 1938; Redford and Redford, 1989), so a short list of projectile point finds is hardly surprising. Debono (1951) noted two stemmed points in blades (shown in Debono, 1951: pl. IIIb) from what appear to have been epipalaeolithic localities in the Lakeita area in Wadi Hammamat. In the same area, he also found transverse arrowheads from a Predynastic occupation site as well as from an Archaic settlement.

Montenant (1986: 251, pl. XXXVI [8-9]) has noted some projectile points from an epipalaeolithic occurrence at Bir Nakhla (about 25 km inland from the Gulf of Suez, and about 20 km south-west of Ras Gharib) which are made on regular bladelets. It seems possible that they share some affinity with the epipalaeolithic examples Debono found in the Lakeita area.

Summary and Conclusions

The projectile points from Umm el-Dabadib are mostly made on thin tabular pieces of flint and on blades. They comprise mainly stemmed and lens-shaped forms, the other distinctive forms being ouanian, concave-base and transverse. These points have predominantly unifacial or bifacial *couvrante* retouch. The retouch scars are generally collateral, elongate and subparallel.

The Umm el-Dabadib projectile points resemble projectile points from other post-Palaeolithic occurrences in the Kharga Depression. In addition, parallels occur from elsewhere in the Western Desert, most notably from Dahkla Oasis and the site of Lobo in the Great Sand Sea.

There are no similarities with any Neolithic or Chalcolithic arrowheads from Sinai and the Negev. Nor are there any parallels among the very limited number of projectile points from later prehistoric sites in the Eastern Desert.

A comparison of Kharga arrowheads with examples from Neolithic and Predynastic sites in the Nile Valley does not reveal any really close similarities either, although concave-base, lens-shaped, transverse and stemmed projectile points do occur in the Nile Valley. But the concave-base points, for example, are generally more refined with incurved, tapering barbs than any of the specimens from Kharga.

The regional variation seen among the projectile points (and indeed the lithic assemblages as a whole) from early and middle Holocene sites in the Western Desert is suggestive of relatively restricted seasonal population movements. Each group probably adopted a tethered settlement strategy within its own region rather than a more mobile form of nomadism involving, say, widely separated oasis-depressions or the Nile Valley (cf. Banks, 1984b: 217-219, 238-240). There may have been greater seasonal movements at the beginning of the Holocene (when the lithic industries were predominantly microlithic) and again later on (from roughly 5000 bp) with the onset and then decline, respectively, of the moister conditions of the 'Holocene Wet Phase' (Banks 1984b: 240-242). Indeed, arid episodes of increasing severity during the middle Holocene as the climate shifted to the present dry regime may have driven some desert groups to settle in the Nile Valley, and consequently play a role in the emergence of the Predynastic cultures there, rather than merely incorporate the Nile Valley as part of an annual migration cycle (cf. Hassan, 1986; Holmes, 1989: 367-387; Wendorf *et al*, 1990).

Fragments of the large freshwater bivalve species *Aspatharia rubens* as well as marine cowrie shells have been found in both early and middle Holocene contexts in the Nabta - Bir Kiseiba region (Gautier, 1980; 1984). These suggest contact with the Nile Valley and the Red Sea coast. While it is possible that groups from the Nabta - Bir Kiseiba region camped in the Nile Valley (about 200 km away) during the dry season (cf. Wendorf and Schild, 1984), they are unlikely to have seasonally migrated to the Red Sea. Rather, both the Nilotic and marine shells probably represent some sort of exchange between groups. The only other Western Desert occurrence of either type of shell is in Dahkla Oasis. Three Sheikh Muftah sites have yielded marine shells (one of which is stated to be a cowrie; McDonald, in press), but these almost certainly represent imports. The Sheikh Muftah culture (approx. 5200-4000 bp) was contemporary with the Predynastic, Early Dynastic and Old Kingdom periods in the Nile Valley.

Thus the projectile point data, along with other available evidence, suggest that throughout much of the early Holocene and probably all of the middle Holocene (to ca. 5000 bp), each Western Desert group limited itself to a given region, generally travelling at most only a few tens of kilometres between, for example, an oasis-depression and an adjacent plateau. Nevertheless, considering the similarities between the post-Palaeolithic industries of the Dakhla and Kharga Depressions and the relative proximity of these areas (the distance between them being minimally about 70 km), there may have been seasonal movements between these two regions.

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Abbreviations used:

IEJ = Israel Exploration Journal

JSSEA = Journal of the Society for the Study of Egyptian Antiquities

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Table 1

**FREQUENCY AND PERCENTAGE DATA FOR THE UMM EL-DABADIB
PROJECTILE POINTS**

<u>Blank:</u>		
	n	%
thin natural slab	15	33.3
one aspect with natural surface		
(prob. on thin natural slab)	10	22.2
secondary blade	10	22.2
secondary indet. flake or blade	5	11.1
blank indeterminate	5	11.1
Total	45	99.9
<u>Form:</u>		
	n	%
stemmed	16	35.6
(with barbs)	(3)	
(with incipient barbs)	(1)	
lens-shaped	10	22.2
ounanian	4	8.9
concave-base	2	4.4
transverse	1	2.2
irregular/other	5	11.1
broken willow-leaf or		
lens-shaped	5	11.1
fragments	2	4.4
Total	45	99.9
<u>Cortex or other natural surface:</u>		
	n	%
no natural residual surface	18	40.0
ancient patina on one side	11	24.4
ancient patina on both sides	15	33.3
cortex on one side	1	2.2
cortex on both sides	0	0.0
Total	45	99.9

Table 2

**DIMENSIONAL DATA FOR THE UMM EL-DABADIB
PROJECTILE POINTS**

	n	mean	S.D.	range
Dimensions				
length	24	32.5	11.0	16-58
width	43	12.5	4.8	7-31
thickness	45	2.7	1.2	1-5
Stem dimensions of stemmed points (stems complete enough to measure: n=13)				
stem length	13	9.5	3.3	6-17
stem width	13	6.1	2.3	3-12
stem thickness	13	2.2	0.7	1-4

Table 3

RETOUCH DISTRIBUTION

point type	Marginal retouch	Predom. unifacial retouch	Predom. bifacial retouch	ounanian retouch distribution	Totals
stemmed	5	8	3	-	16
lens-shaped	1	4	5	-	10
ounanian	-	-	-	4	4
concave-base	-	1	1	-	2
transverse	1	-	-	-	1
irreg/other	1	2	2	-	5
broken willow 1-1					
leaf/lens-shaped	1	-	4	-	5
fragments	-	1	1	-	2
Totals	9 (20.0%)	16 (35.6%)	16 (35.6%)	4 (8.9%)	45 (100.1%)

Table 4

BREAKAGE DATA FOR THE UMM EL-DABADIB PROJECTILE POINTS

	n	%
unbroken	20	(44.4)
breaks:		
minor tip	7	28.0
base only remains	4	16.0
tip and base broken	4	16.0
broken stem	2	8.0
barbs (one or both)	3	12.0
stem and barb(s)	1	4.0
other	4	16.0
Total breaks	<hr/> 25	<hr/> 100.0

Anta 1 de Val da Laje 1989/90

The Excavation of a Passage Grave at Tomar, Portugal

by PETER DREWETT*, LUIZ OOSTERBEEK, ANA ROSA CRUZ and PAULO FELIX* *

Introduction

The Institute of Archaeology, University College London and the Escola Superior de Tecnologia de Tomar (Portugal) are involved in an inter-university co-operation programme with the support of the ERASMUS Bureau of the European Economic Community. As part of that Programme (and in association with the Universities of Granada, Sevilla, Coimbra and Santarém) an intensive 'Introduction to Archaeology' course was held in Tomar in July 1990 (Fig. 1). Twenty Portuguese and Spanish students undertook a practical introduction to fieldwork. This report describes the archaeological results of this fieldwork.

Anta 1 de Val da Laje (VL1) is part of a megalithic necropolis (Fig. 2) that was first identified by a local group of archaeology enthusiasts, the C.E.P.P.R.T. (Centre for the Study and Protection of Tomar's Cultural Heritage). One of us (Luiz Oosterbeek) visited the site in 1985, and it was later decided to excavate one of the monuments as part of the E.S.T.T. project on the Neolithic in the region of Tomar.

The excavation started in 1989 at Monument 1 (out of five), directed by A.R. Cruz and L. Oosterbeek, and was funded by the Portuguese Institute of Youth. In 1990 a second campaign was undertaken, co-directed by P. Drewett, as part of the Intensive Field Course mentioned above. This was funded by the Erasmus Bureau, the Portuguese Institute of Youth and the local Town Hall. Twenty Erasmus students and twenty other volunteers took part in the fieldwork in July and September.

The Environment of the Site

Since 1983 a landscape project has been studying the Neolithic of Tomar (Fig. 1). This region is the intersection of three main geological formations: Jurassic limestones in the north and northwest; Palaeozoic schists in the east; and Miocene and Quaternary deposits in the south. The soils run from rich arable in the south to poor forestry-adapted soils. *Pinus* and *Quercus* spp. with *Vitis vinifera*, maize and other cereals, dominate the landscape. All the main resources utilized by prehistoric people are abundant: water, wood, different soils, and stone (mainly quartzite, flint and quartz). The river Nabão crosses this region and unites its diversity. It flows to the river Zêzere, which runs through the eastern part of the region and is the main tributary of the river Tagus, one of the three most important rivers in Portugal, (Oosterbeek, forthcoming).

About eighty prehistoric sites have been identified, consisting of burials in caves, settlements, flint mines and small megalithic passage graves. In order to understand the evolution of the post-Palaeolithic communities to the Bronze Age, one area of 5 km² has been selected in each

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Figure 1 The Iberian Peninsula, showing location of Tomar.

geological unit, and within them several sites have been excavated. Five phases were identified:

Phase 1: Simple individual surface burials in caves, with microliths and cardial impressed pottery in the 6th millennium (conventional early Neolithic).

Phase 2: Introduction of incised pottery, polished stone and increase of domesticated animals in the end of the 5th millennium (conventional evolved early Neolithic).

Phase 3: Individual arranged burials in caves with complex ritual and clear Neolithic assemblage (conventional middle Neolithic).

Phase 4.1: Collective burials in caves with technological decay in the 4th millennium (conventional late Neolithic).

Phase 4.2: Collective burials in megalithic tombs in the 4th and 3rd millennia (conventional late Neolithic and early Chalcolithic).

Phase 5: Individual burials in caves and first open air stone-built settlements in the 3rd millennium (Bell beaker).

The work already done has led to several main conclusions and new directions for investigation. Firstly, the regional model of development seems to match the Tagus Valley model. Secondly, there are no major differences in the artifacts of Phase 1 to 4.1, pointing to a more or less closed evolution which is then broken in Phase 5. Thirdly, the spatial and social relations between the populations of Phases 4.1 and 4.2 need to be investigated. Finally, Phases 1 and 5

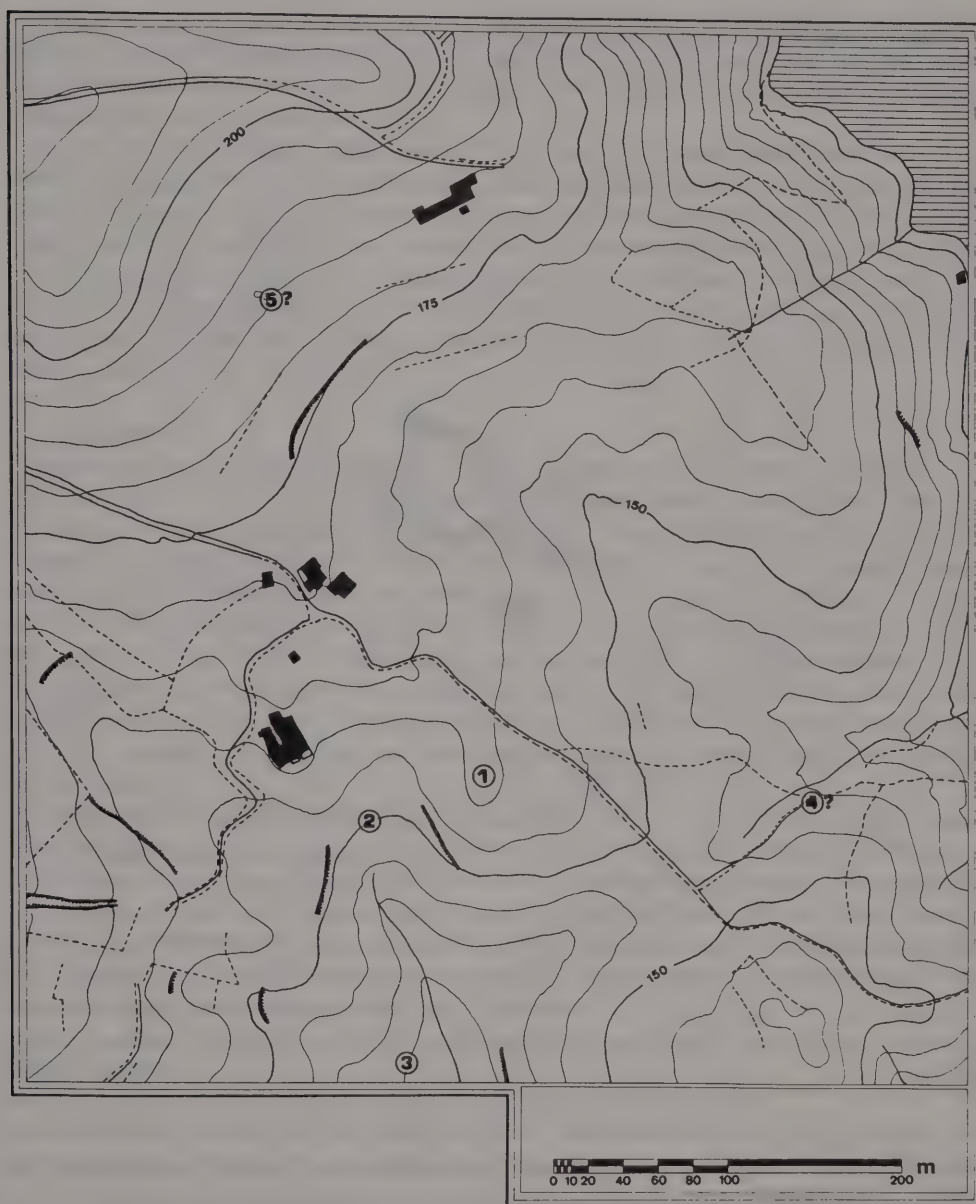


Figure 2 Vale da Laje, Tomar. Location of five tombs of the necropolis. Number 1 excavated. River Zêzere shaded.

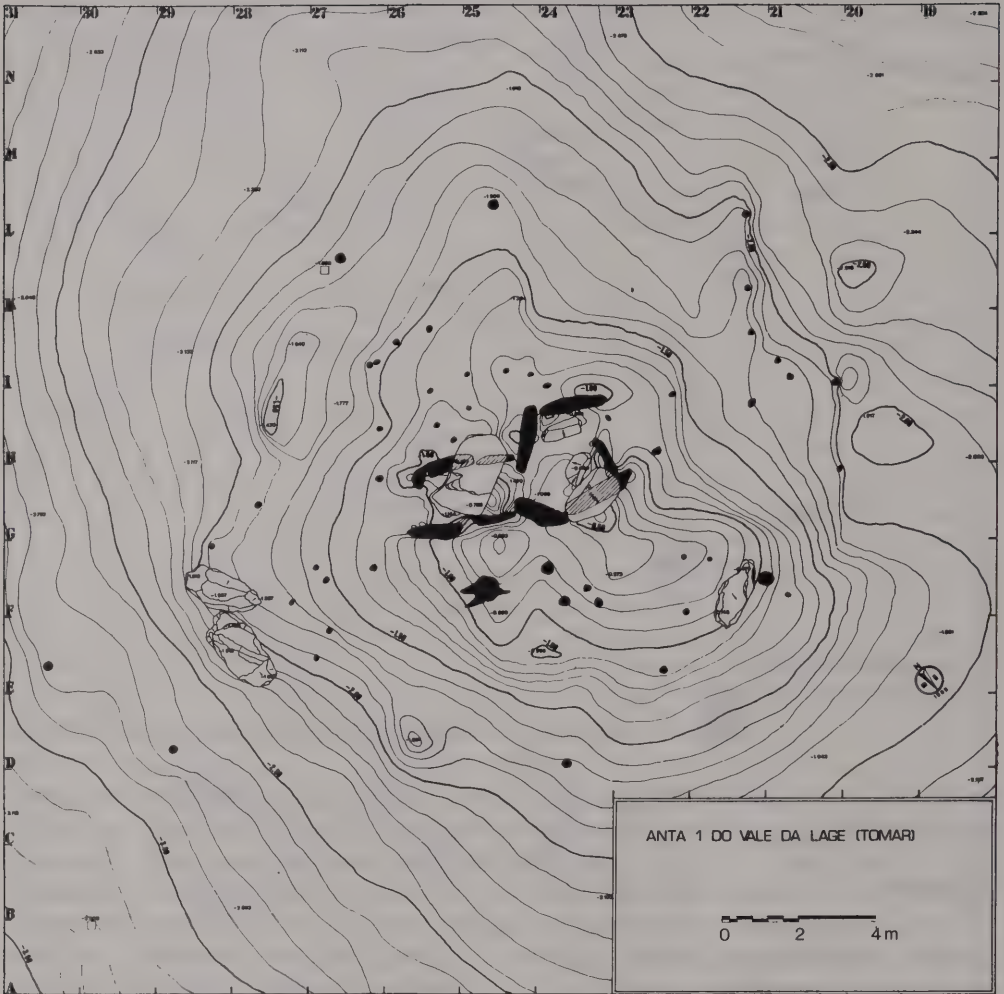


Figure 3 Vale da Laje, Tomar. Plan of passage grave before excavation. Contours at 10cm intervals.

seem to have evidence for external influences (Oosterbeek and Cruz 1988, Oosterbeek and Oliveira, forthcoming).

The excavation of VL1 and the study of the necropolis that includes it was an attempt to follow these directions.

The Field Method

A grid of two-metre squares was set out over the oval -shaped mound. In 1989 three main trenches were excavated in order to get a cross- section of the mound, though without any intrusion into

the monument itself. All the excavation was undertaken by hand. The soil dug was sieved and samples taken for flotation and analysis. All main finds (pottery rims, lithics and bones) were three-dimensionally co-ordinated. All other finds were recorded according to their square and by context or artificial 5cm deep level.

In 1990 the north and east trenches were linked in order to expose a quadrant of the tomb. The north trench was extended towards the south trench, and linked to the west trench, thus exposing another quadrant opposite the previous one. Both quadrants joined at the centre of the chamber, which was partly excavated. The excavation of the southwest quadrant was directed by Peter Drewett; the northwest quadrant was excavated under Luiz Oosterbeek's co-ordination, and Ana Rosa Cruz was responsible for the chamber. Paulo Felix was responsible for surveying and drawing. All the finds, plans, drawings, photographs and other records were deposited in the Archaeological Section of the E.S.T.T.

The Monument

What first drew our attention to this site was the fact that, although it had never been noticed before, it was very well preserved. It consisted of a small mound, today about 1.75m high, containing an irregular pentagonal chamber (Fig. 3, Pl. 1). The capstone has partially fallen down and the cover is broken. The passage is defined by two orthostats on each side, covered by a single stone (possibly a second minor one existed originally). The total length is 5.8 metres (4.8 metres interior), 56% of it being the passage. The maximum width of the chamber is 2.2 metres (Fig.4). The passage is 0.6 metres lower than the chamber, and it narrows towards the entrance. This is closed by another orthostat about 0.8 metres lower than the average height of the passage. The mound is oval-shaped with about 9 metres west-east and 10 metres north-south. It is made of earth and a large quantity of small stones, with an appearance similar to that of a cairn, although it is not one (Fig. 3).

Val da Laje is a small valley in the right margin of River Zêzere. At least five megalithic tombs existed in this necropolis (Fig. 2). Two of them have been completely destroyed. Some of the stones survive from two others (Monuments 2 and 3), together with part of the original mound, though now collapsed. VL1 occupied the highest topographical level of all five. From it one can see the valley, the river, and the four other monuments, though no direct visibility exists between any of the others. Thus, we feel this monument did play a particular role in the necropolis, though we cannot say if it was the most important or the oldest.

The Excavation

Stratigraphical Units Identified (Details archived at E.S.T.T., Tomar)

The excavation proceeded, as mentioned, by opening three trenches (east, west and north) and, in 1990, by linking them in two quadrants and thus obtaining two cross-sections (Fig. 5). All layers, structures, or other features were recorded as separate stratigraphic units.

West Trench, 1989

In a 2 x 6 m. area against the headstone of the chamber, three main levels were identified (Fig. 5): cover soil (Layer 19); brownish soil with many stones and a few pebbles (Layer 20); yellowish soil with almost no stones (Layer 26). Large flat stones were found in the base of the trench, about

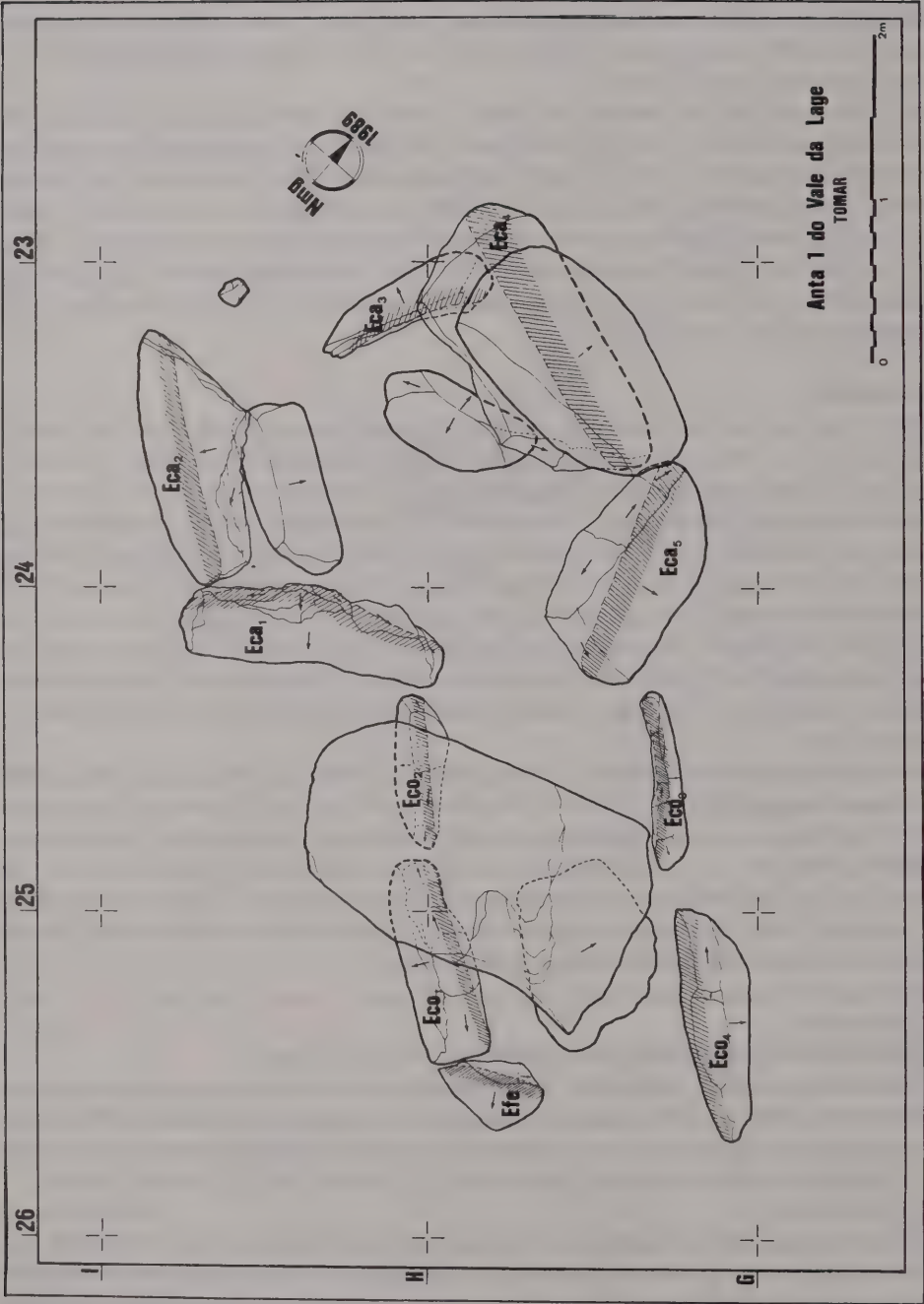


Figure 4 Vale da Laje, Tomar. Detail of megalithic passage and chamber.

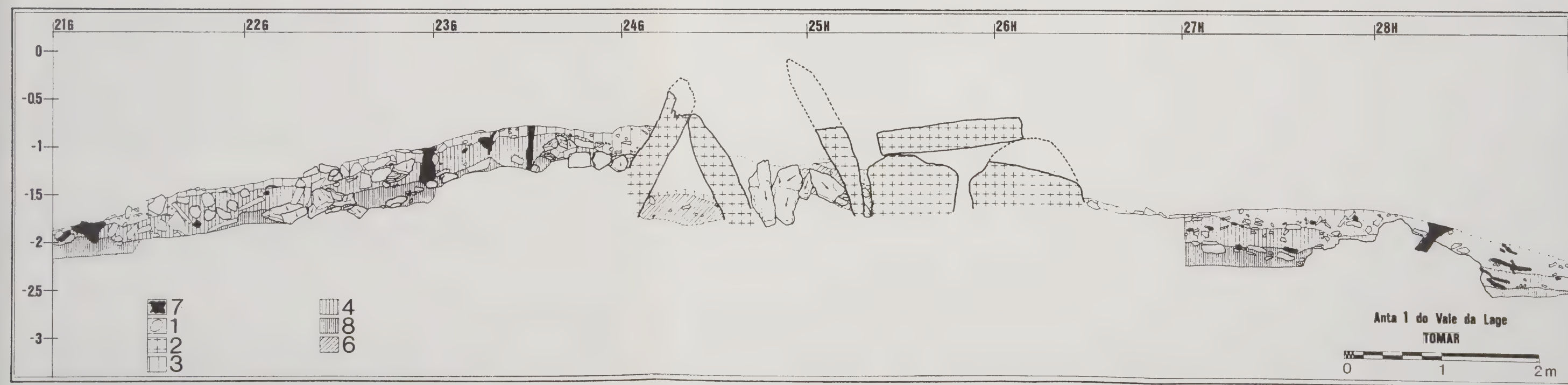
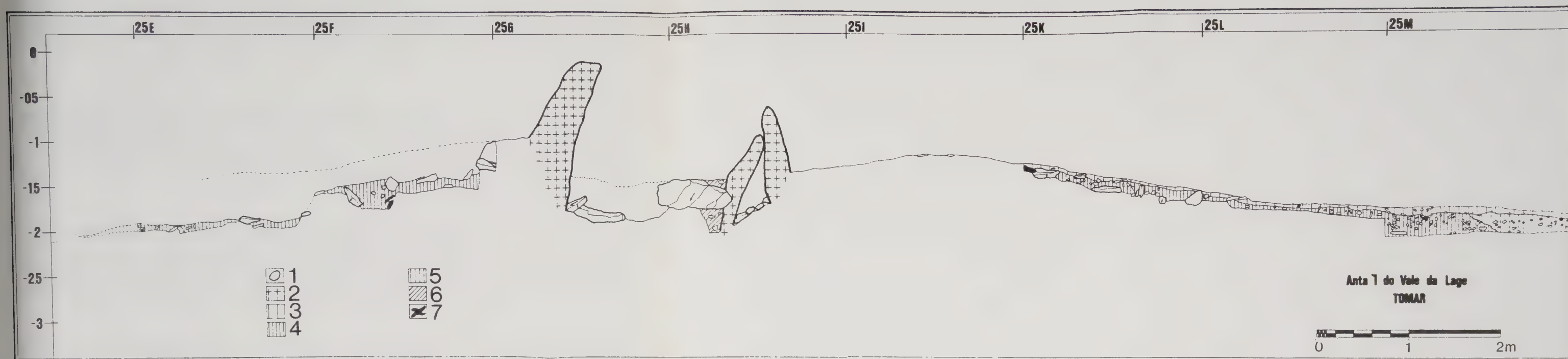


Figure 5 Vale da Laje, Tomar.

Top Section: North-South.

Key: 1. Pebbles. 2. Orthostats. 3. Layer 1. 4. Layer 2. 5. Layer 2 disturbed. 6. Layer 2/3 disturbed. 7. Roots.

Bottom Section: West-East.

Key: 1-7 as above. 8. Layer 3.

four metres from the chamber, and a large quantity of pebbles was recorded further away. Almost no artifacts were recorded in this trench. Flotation gave no significant results in this trench or the others.

North Trench, 1989

A 2 x 5 m. trench was excavated against the chamber. Most of the sequence was made of stones from the chamber buttress. Again, almost no artifacts were found. The same stratigraphy was recognised as in the West Trench (Fig. 5) and, near the top (S.U.15), a deposit (S.U.29) was identified, which included flat-based pottery of the Bronze Age.

East Trench, 1989

A 2 x 4 m. area was dug beside the entrance, though excavation was not completed since the quantity of finds was very great. Layers 01 and 02 were also identified (Fig. 5). Layer 02 included a very large sample of pre-Beaker Chalcolithic finds (pottery, arrowheads, schist plaques, and other artifacts). A curved setting of big, round pebbles was found against the entrance (S.U.5).

Northeast Quadrant, 1990

Apart from the layers and structures already mentioned, two oval-shaped structures (Plate 2), passage floors and a circle of ashes were identified. We also recognised the continuation towards the north of the pebble setting mentioned above, and its relation to a similar one in the opposite quadrant. Layers 02 and 03 were clearly distinguished. Layer 04 was identified as archaeologically sterile.

Southwest Quadrant, 1990

Basically two features have been identified here, both are included in S.U.20 (i.e. the second layer below the surface). First, a more or less clear pattern of round and quartzite pebbles, separated from the schist blocks, was recognized. The schist blocks were nearer the chamber and were separated from the pebbles by small standing schist stones (about 30 to 50 cm. in height). Secondly, a sequence of big schist flagstones (about 1 m. long) was found lying around the chamber, at an average distance of 2.5 m. from it. These have been interpreted as structural supports of the cairn, while the round quartz and quartzite pebbles were a collapsed revetment.

Chamber, 1990

The excavation of the dolmen chamber enabled us to identify two layers, broadly related to S.U.01 and 02. The upper layer was badly disturbed. Also two other probable stratigraphic units were located, corresponding to the foundations and building of the dolmen, but these have not yet been excavated.

The Artifacts (Figs. 6 and 7)

Pottery

All the pottery can be classified into seven basic groups (Fig. 8):

- A: hemispheric bowls with large rim and round bases, present in Layer 02;
- B: very shallow carinated bowls with flat bases, in the deposit of S.U.29;



Plate I Vale da Laje, Tomar. Passage grave from the north (scale 1 m.)
(Photo. P.L. Drewett).



Plate II Vale da Laje, Tomar. Forecourt to passage grave from southwest, showing
cobbling and small cairn (scale 1 m.)
(Photo. P.L. Drewett).

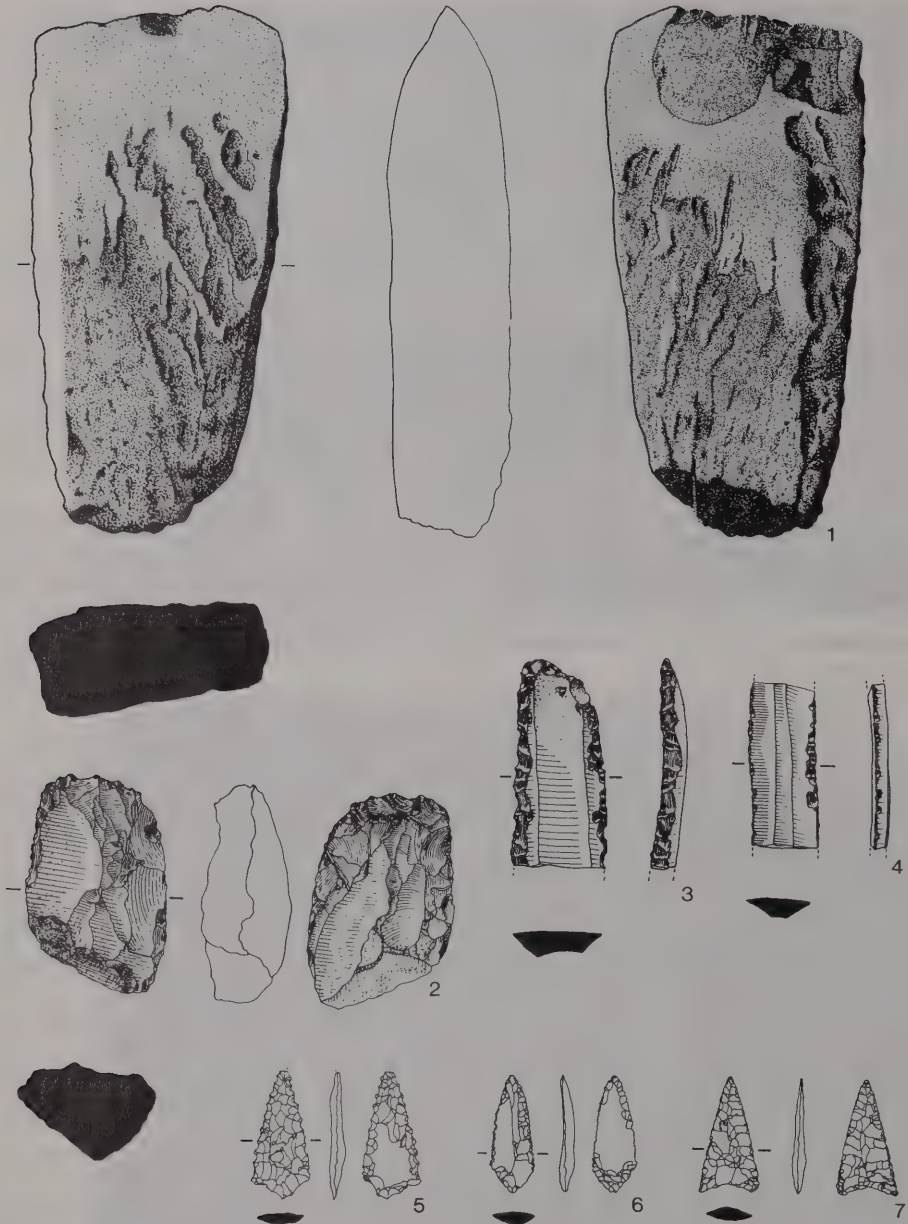


Figure 6 Vale da Laje, Tomar. Lithics. Scale 1:2
1. Polished schist axe. 2. Quartz core re-used as a scraper.
3, 4. Retouched flint blades.
5, 6, 7. Main flint arrowhead types (Layer 2).

- C: shallow hemispheric bowls with simple round bases in all the layers;
- D: hemispheric bowls with oval shaped tops (Layer 02);
- E: round bowls (Layers 02 and 01);
- F: flat based vessels (Layer 02);
- G: beaker decorated sherds (Layer 01).

Most of the vessels (69%) were fired under reducing conditions, though all the sherds in Layer 03 showed evidence for oxidation. All the forms are small, running from 200 to 300 cm³, with the exception of a round bowl in Layer 02, with a volume greater than 1,000 cm³. Most of the pottery, except for the Beakers, is undecorated (Figs. 7 and 8).

Lithics

The lithic industry is represented largely by blades (most of them retouched, present in Layers 01 and 02), arrowheads (in Layers 01 and 02, but exclusively of concave-base type in Layer 01), microliths (long trapezes, and exclusively in Layer 03), and polished stone axes (in all layers, though smaller and very finely polished in Layer 03). Also schist decorated plaques (in Layer 02), discoid (Layer 02) and tubular (Layer 01) beads were found (Figs. 6 and 7).

Bone

A human rib fragment and a human phalanx were found in the second layer of the chamber.

Discussion

The Stratigraphy

Four major layers have been identified (from the top to the bottom):

- A - including S.U.1, 15, 19 and 24;
- B - including S.U.2, 16, 20 and 25;
- C - including S.U.3, 17 and 26;
- D - including S.U.4 and 18.

In the first phase (Layer D) we assume the platform was levelled and some pits must have been dug to help support the passage grave orthostats.

In the second phase (Layer C), the standing stones were placed in position (Phase 2.1). Then, the flat flagstones, the buttresses and probably some sort of provisional wood or stone inner buttress were built (Phase 2.2). Later, the monument's coverstone was placed in position, the inner buttress was removed, and an entrance passage was built (Phase 2.3). Finally, the whole was covered by an artificial mound, leaving the entrance open (Phase 2.4).

Still in Layer C, there was a third phase when a sub-circular structure was built near the entrance (Phase 3.1), partially covering the entrance passage. Beside, a ritual fire was made (Phase 3.2).

Phase 4 (Layer B) was marked by a partial rebuilding of the mound, basically with stones, producing the aspect of a cairn (Phase 4.1). A sub-circular revetment wall made out of round pebbles, separated by standing flagstones, was then built (Phase 4.2). To test this hypothesis we built such a wall, and studied the distribution pattern of its destruction. This matched the pattern excavated.

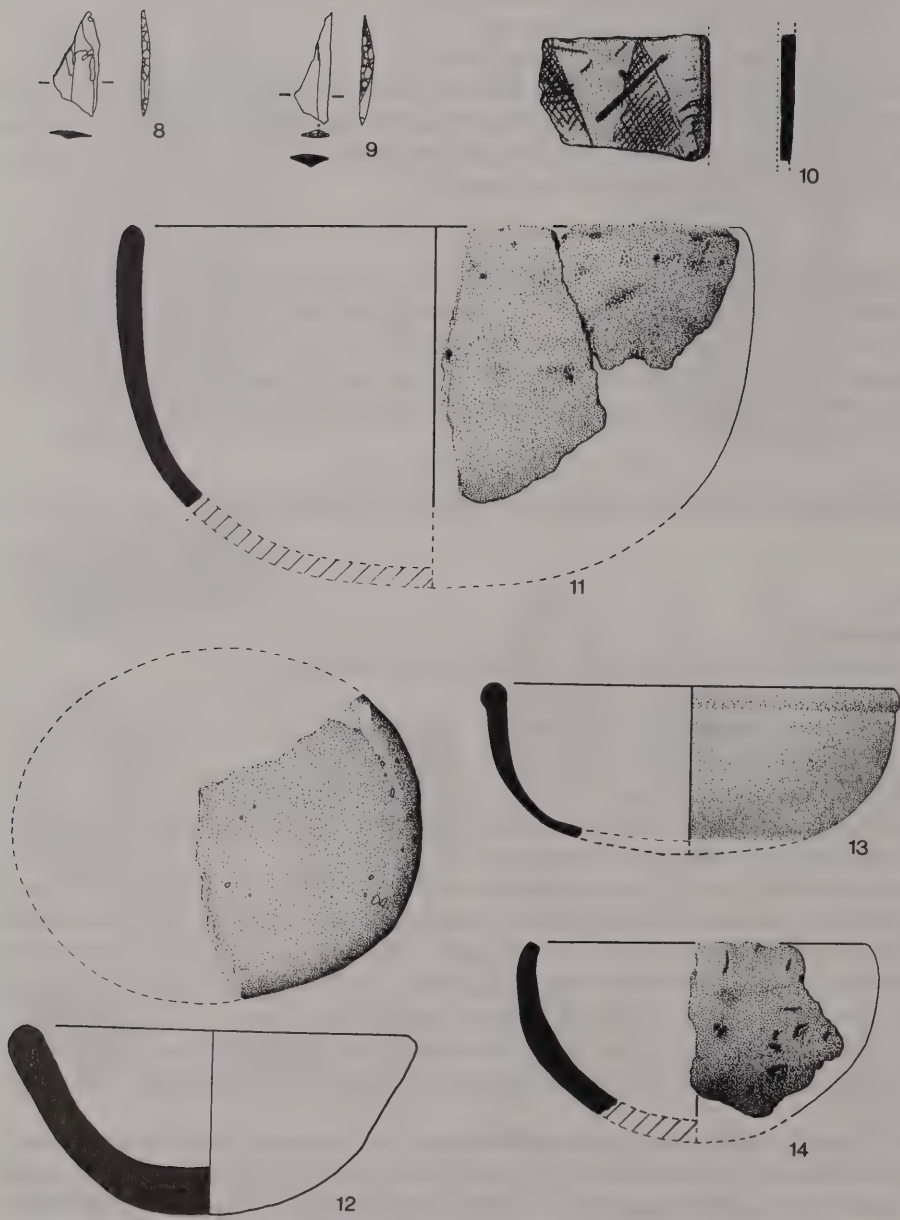


Figure 7 Vale da Laje, Tomar. Scale 1:2
8, 9. Flint microliths (Layer 3). 10. Decorated schist plaque. 11-14. Round based bowls.

At the fifth phase, a second round structure was butted against the pebbles wall near the entrance. At the top of Layer B, we saw the evidence of the entrance closing (with a flat stone - Phase 6.1) and of a new design of the circle wall which became closed (Phase 6.2). In the top layer, the only significant structure was a Bronze Age deposit in the north trench.

The Chronology and General Interpretation

In searching for regional parallels in the Nabão valley, we examined the marked difference between the artifact assemblages of VL1 and the cave burials. This difference means either that these assemblages are chronologically separate or, which seems more probable, two different group traditions existed together, but separated by local geomorphology. If we look further south, in Torres Novas (about 80 km. distant) we find the same assemblages in collective burials in several caves, in what was called "cave megalithism" (Ferreira 1970, Gonçalves 1978). Apart from this relation, we have of course the other four megaliths of Vale da Laje and three others on the other side of the River Zêzere.

Further parallels can be traced at greater distances. In Alentejo, the Anta 1 de Poço da Gateira (Leisner 1951) is closer to VL1: small passage grave and mound, with undecorated round pottery, microliths, unretouched blades and polished stone (artifacts assemblage similar to Layer C in VL1), dated by T.L. to 4510 ± 360 B.C. (Whittle and Arnaud 1975). Also in Alentejo, the T.L. dating of some sherds from a large passage grave called Anta Grande da Comenda da Igreja with an artifact assemblage closer to VL1's Layer B gave a result of 3235 ± 310 B.C.

It is true that any site must be studied within its internal and external context, and isolated parallels may prove to be of little significance and misleading. Yet, if we look back to the Nabão valley, though we do not find morphological parallels, we are able to identify two main similarities between the three archaeological layers at VL1 and the cave stratigraphy.

Firstly, there is an evolution from individual to collective burials in caves. The individual Neolithic graves from the 5th millennium (when calibrated), and collective burials date from the middle 4th millennium. Secondly, while the former are quite different from VL1, the latter show some parallels in the artifact typology within Layer B (retouched blades, polished stone, pottery morphology), even though suggesting a greater archaism (absence of arrowheads, presence of a few microliths), which also matches the time difference between Anta Grande da Comenda da Igreja and the Nabão caves collective burials. Also, these collective burials are organized in large necropoles, in Vale da Laje represented by five megalithic tombs, and in the Nabão Valley by a major concentration of collective burials in neighbouring caves.

Therefore apparently we have in VL1 a sequence of:

Layer C, being Neolithic of ancient tradition, contemporary with the individual graves in caves in the Nabão, and thus pointing to a different origin in the 5th millennium;

Layer B, being early Chalcolithic and contemporary with collective burials in caves, in the second half of the 4th millennium;

Layer A, being late Chalcolithic (Beaker), in the second half of the 3rd millennium and with strong correlation with the individual burials in caves.

In this model, contacts would exist between both communities, proved by the presence in each of raw materials only existing in the other. These communities would have remained separated until the introduction of Bell beakers associated with the appearance of the first big open air

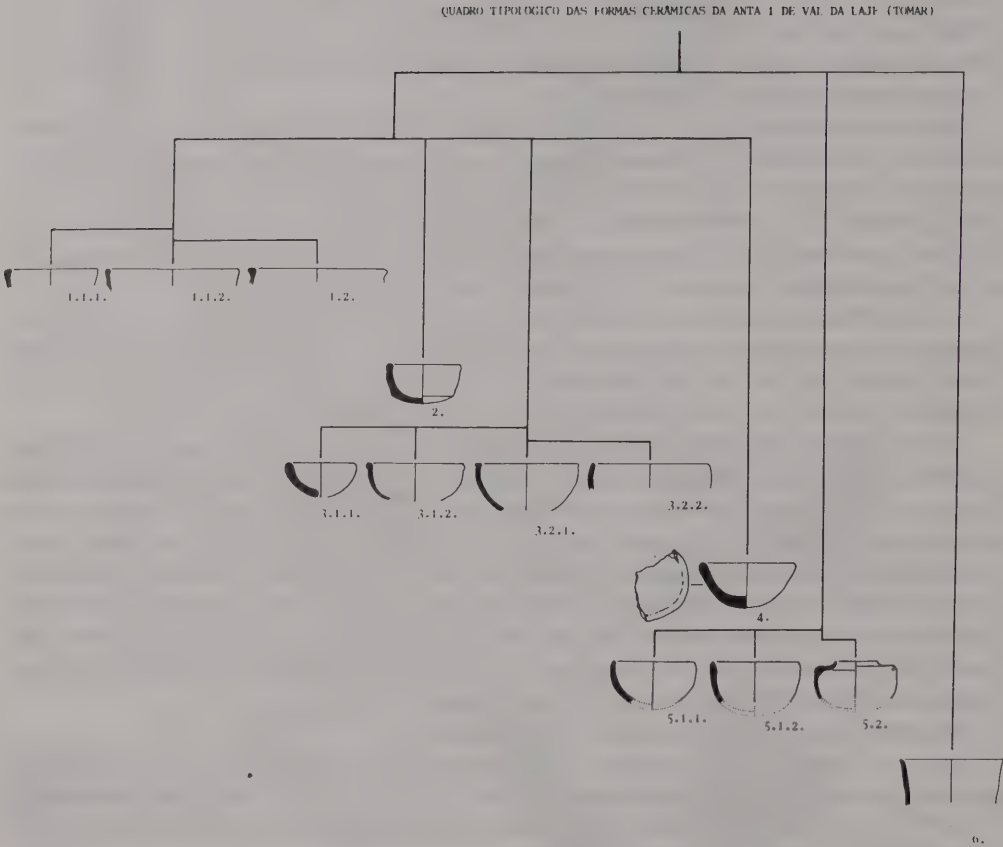


Figure 8 Vale da Laje, Tomar. Cluster distribution of pottery types in Layer 2.

settlements and individual graves. This would imply that though the traditions were distinct there were interactions, possibly due to pressure on raw materials, and therefore we see a similar pattern of increasing social complexity in both communities (Oosterbeek, Oliveira and Martins, forthcoming).

Acknowledgements

For allowing the excavation and being so welcoming, we thank the owners, Mr José Maria Caetano and Mrs Lúcia Batista Caetano. For the financial support we are grateful to the Institute of Youth, its very committed regional delegate Mr A. Fidalgo, the Erasmus Bureau of the European Communities, Tomnar's Town Hall and its President, Mr Pedro Marques. We would like to thank, for all the help with accommodation for students and other crew, M. Vitor Borges, President of the Municipality Parliament and Director of the Escola Secundária no. 3, and for the field tents used in excavation, the Army Infantry Regiment of Tomar and its Commandant. For the legal support, we are indebted to the Portuguese Institute for the Cultural Heritage (I.P.P.C.). All illustrations were drawn by Paulo Felix and graphic reproduction of plans and drawings was carried out by Mr Francisco Antunes. We wish also to thank Dr. Pedro Aguayo de Hoyos and Mrs Katina Lilios for the discussions we have held during their visits.

Professor Vitor O. Jorge visited the site before excavation. His suggestions upon the fieldwork and orientation of the project as a whole proved to be extremely valuable.

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Pregnant Women (rḥmt) in The Moabite Inscription

by SIMCHA BROOKS*

The stele of King Mesha of Moab was discovered in 1868 by a German missionary at Dibon, modern Dhiban, 13 miles east of the Dead Sea, north of the River Arnon. This stele is made of black basalt: it is 1.15 m high, and about 60-68 cm wide. The inscription tells of the successful campaign of King Mesha to free Moab from the Israelite yoke, This took place after the death of Ahab, king of Israel, ca. 850 BCE. The language of the inscription is classified as an independent Semitic dialect, closely related to Hebrew, especially the Israelite dialect (Gibson, J.C.L., 1971: 72).

Of the 34 lines inscribed, line 17 is of special interest. We are told that the king slew seven thousand men and women. The breakdown of the casualties indicates five different categories. The first two are in the masculine form ending in **n**. The first is *gbrn*, from *gbr* (גבר) 'grown man'; the second is *grn*, interpreted either as coming from Hebrew *gūr* meaning lion cub (and in this instance meaning 'boy') or as from Hebrew *gēr* meaning 'resident alien'. The other three groups possess the feminine ending **t**; *gbrt* (גברת) meaning 'women', and *grt* meaning 'girls' or 'female resident aliens'. The fifth term in line 17 *rḥmt* (רחמת) also ends in the feminine form **t**. It is usually explained as 'damsels', on the basis of Hebrew *raḥam* (Judges 5:30), meaning a girl imagined to have been captured in battle. In the Ugaritic myth of Baal and Mor too, *rḥm* again means a girl, and is applied to Anat as she longs for the dead Baal.

This interpretation, while generally accepted, is open to a fundamental difficulty. Why should *rḥmt* have no male counterpart, while the other female terms *gbrt* and *grt* do? The distinction between *rḥmt* and the other classes cannot have been merely social. Thus if, for example, *rḥmt* had meant 'concubine' rather than wife' one would doubt that a soldier or a scribe would have time to note this fine distinction from other women amid the turmoil of war. Or if *rḥmt* means 'female slave' why are male slaves not similarly distinguished?

The word *rḥmt* (רחמת) evidently comes ultimately from Semitic *rḥm* 'womb'. Hence another meaning may be proposed: 'pregnant woman'. An exactly similar development occurs in Aramaic with the roots *bṭn*. From the noun *beṭen* : 'womb' a verb *bṭn* 'conceive' is derived, and *baṭna* means a pregnant woman. Pregnant women are easily recognised in battle, and have no male counterpart. On this view the Moabites not only killed men, boys, women and girls, but also made a special point of killing pregnant women. The atrocity of slaying pregnant women, and indeed ripping them open was committed by the Assyrians, and also other nations in the ancient Near East.

In Assyria there is only one reference to this in a text of the Middle Assyrian period, under Tiglat Pileser I (1115-1077 BC), which says 'He slits the wombs of pregnant women' (Cogan, M. 1983: 756). Given the depiction of the Assyrians as cruel warriors, on relief and wall inscriptions, one is surprised not to find more such references.

A second reference comes from the Tammuz Lament, a Sumerian text which survived in a single copy on a late Babylonian tablet. It says (line 19), 'my eyes cannot look on ... the ripping

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of the mothers' wombs' (Lambert, W.G. 1983: 212).

The Bible contains a number of references to this atrocity. II Kings 15:16 describes Menahem King of Israel, the only king to commit such an act; he ripped up every pregnant woman in the city of Tiphshah. The prophet Amos spoke violently against the Ammonites because they ripped open the pregnant women of Gilead (Amos 1:13). When Hazael was to ascend the throne of Damascus, Elisha wept. He feared that the new king Hazael would rip open the pregnant women of Israel (II Kings 8:12). Hosea blamed the people of Samaria for deceiving their God, and among their punishments, their pregnant women would be ripped open (Hosea 14:1).

If the *rhmt* whom Mesha killed were also pregnant women, we must suppose that *rhmt* 'womb' produced different derivatives in the different dialects: 'girl' in Hebrew and Ugaritic, 'pregnant woman' in Moabite. Terms for women are notoriously volatile in meaning; thus no one could guess from Greek *gunē* 'woman' the nuances of its English cognates 'queen' and 'quean'.

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The Medinet Habu Inscription and the Red Sea Narrative

by SIMCHA BROOKS*

Ramesses III's contemporary inscription on the north wall of the Great Temple at Medinet Habu provides the main source for the history of the period ca. 1194-1162 BCE (Sandars N.K. 1985, 208). The inscription gives an account of the victorious wars of Ramesses III in 1189 against the Sea Peoples.

In this instance the wars against the Sea Peoples are of special interest. The inscription and illustrations provide vivid scenes of the land and sea battles. The purpose of this paper is to call attention to some close resemblances that they bear to passages in the Red Sea narrative in Exodus 13-15.

Thus in Exodus 13:21 we are told that 'the Lord went before them in a pillar of fire to give them light', whereas Ramesses's inscriptions say 'while the flame was prepared before them' (Pritchard, B.J., 1955: 262-263).

In Exodus 14:22 '... and the waters were a wall unto them on their right hand and on their left'. This is very similar to the inscription 'I have the river mouths prepared like a strong wall'.

In Exodus 14:7 'and he took six hundred chosen chariots (רֶכֶב בָּחוּר) of Egypt...' and in Exodus 15:4 'Pharaoh's chariots and his host... and the pick of his officers (מִבְּחֵר שְׁלֵשִׁי) sank in the Red Sea'. Similarly in Ramesses's inscriptions 'the troops consisted of picked men of Egypt ... the chariotry consisted of runners who were good and capable chariot warriors... the ships were as if fallen into the water' (Pritchard, B.J. 1955: 262-263).

In Exodus 14:27 it is stated 'and the sea returned to its strength' (וְלִאִתְּנוּ). A similar passage in Ramesses's inscription states that 'I have made the lands turn back'.

One other parallel may be found from the land battle against the Sea Peoples. The enemies who were defeated by Ramesses are described as having been surprised while on the move, 'they were with their heavy ox cart transport'. Similarly we have in Exodus 14:25 'and he took off their chariot wheels (וְסָר) and made them drive heavily'.

How are these parallels to be explained? It is not of course suggested here that Ramesses III, as late as the 12th century BCE, was the Pharaoh of the Exodus. It may be, however, that when the biblical account was written, probably centuries later, elements from Ramesses III's triumphant inscription were taken up, with deliberate irony, in order to portray Israel's victory against Egypt.

Alternatively, the Israelite author may have encountered other royal Egyptian inscriptions from a later period. These inscriptions all tended to use standard poetic language. They are not historical annals like those of the Assyrians, but phrases with attached scenes aimed to display the victories the god had granted the kings. These texts often tended to 'creep' from one royal temple to another even though no two royal temples are wholly alike.

The fact that Ramesses III reigned later than the dates proposed for the Exodus would in no

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way preclude such literary borrowing. The Israelite writers were not concerned to distinguish one Pharaoh from another. In the Exodus narrative we read only of 'Pharaoh' or 'the king of Egypt'. So far as the Israelite writers were concerned, all these kings of Egypt merge as 'Pharaoh'.

This would not be the only instance of Israelite familiarity with the boastful inscriptions of contemporary emperors. II Kings 19:23-24 is an authentic reflection of the boasts of an Assyrian monarch, as is Isaiah 10:8-11. In both those passages, the tyrant is made to boast, only to be silenced by God. In the Red Sea narrative, the author goes further. He uses motifs from the victorious boasts of Pharaoh, in order to depict the destruction of Pharaoh.

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Chalcolithic Sealings From Arpachiyah in the Collection of the Institute of Archaeology, London

by ALWO VON WICKEDE*

The prehistoric clay sealings from Arpachiyah present an important corpus hitherto only partially published by Mallowan¹. The corpus consists of sealings of the Halaf and late chalcolithic periods, the latter dating almost exclusively to the Gawra period. A single cylinder seal impression of the Ninevite 5 period is also included in the corpus.

The sealings from Arpachiyah are of special significance in that they present the only large, stratified group of sealings of the Halaf period. Furthermore, the sealings of the Gawra period offer important comparisons to the sealings from Tepe Gawra itself.

All prehistoric clay sealings found in Arpachiyah are included in the following catalogue (Chart 1)². Illustrated here are primarily those pieces in the Collection of the Institute of Archaeology³. In some cases, pieces from the British Museum are included for comparative purposes⁴. With the exception of two sealings in the Iraq Museum (No. 41 and No. 48), all pieces mentioned by Mallowan could be identified in the respective collections.

1. Stratigraphy and Localization of the Sealings

Stratigraphic evidence for dating the sealings from Arpachiyah is often ambiguous. The reasons for this lie in the fact that find spots are either inaccurate or not adequately described. Further problems arise, because trench designations used by Mallowan in his field notebook are not mentioned in the later publications where he refers only to a grid plan. Thus, the only real stratified material consists of the correlated sealings from the 'burnt house', also called 'potter's shop', of level TT 6. The exact find spots of the sealings, which were found scattered over the floor of the so-called 'burnt room' together with pottery vessels, pieces of jewellery, stone implements, etc., are not documented⁵. Part of the inventory of the 'burnt room' consists of 18 or 19 ovoid clay bullae with the field numbers A 619 (Nos. 25-42)⁶ as well as 8 circular to oval clay disks with the field numbers A 620 (Nos. 43-50). All of these pieces, with the exception of one (No. 50), bear one or more seal impressions, and all are clearly associated with level TT 6 on the top of the

¹ Mallowan/Rose 1935: Pl. IXa-b.

² Addendum to catalogue No. 41: Cf. Mallowan/Rose 1935: Pl. IXb, 2nd row, 3rd from left.

³ The Institute of Archaeology, University of London is referred to in the catalogue as I.A.U.L.

⁴ For the pieces in the Iraq Museum see the new illustrations in von Wickede 1990: Pls. 58; 59; 61; 62; 69-71; 79; 416.

⁵ Cf. Mallowan/Rose 1935: 16f.; 105, and Pl. XXIIb.

⁶ Nine pieces are divided between the Institute of Archaeology and the British Museum, while the rest are located in the Iraq Museum. Different remarks in Mallowan's notebook refer to 9 or 10 pieces in the Baghdad collection, but only nine sealings with the inventory no. I.M. 15185 are present (personal communication by C. Limper).

mound, thus dating to the late Halaf period. Only few sealings were found in other levels on the tepe. A small bulla (No. 24) was found at a depth of 3 metres, which would correspond to level TT 5, and probably belongs to the Halaf period. Two sealings (No. 22 and No. 70) come from the 'Ubaid level TT 2.

Four sealings (Nos. 1-4) were found in a well associated with level TT 4 by Mallowan. The well was first used as a refuse pit beginning with level TT 4 and was later reused as a grain silo⁷. The pottery from the well offers no clear indication as to the date, since Halaf and 'Ubaid sherds were found mixed with Gawra and even Ninevite 5 sherd material. In the Institute of Archaeology sherd collection from Arpachiyah, a sherd of the Gawra period labeled 'TT 4' is present alongside 'Ubaid sherds. This sherd is important because of its fine corrugated neck and shoulder decoration and its very close relationship to pottery from level XI/XA in Tepe Gawra⁸.

Further sealings from the trenches on top of the mound (TT) in Arpachiyah lack sufficient information concerning their find spots, so that stratigraphic evidence for dating is not available (Nos. 17; 23; 65).

A large part of the sealings from Arpachiyah originates from areas outside the tepe ('outlying areas') and not from the top of the mound ('akropolis mound'). Based on Mallowan's field notebook, the localization of specific trenches in the 'outlying areas' is very difficult to determine, since the trenches are not included on any site plans⁹. The trenches were included for the first time on the contour plan of Hijara's excavation report of Arpachiyah, although they are not identified there by letter¹⁰. The different trenches can therefore only be localized with the help of Mallowan's records of small finds and burials¹¹.

Trenches A and B are to be located in the area of the road to the tepe ('Ak. road' = akropolis road). Trench C can be located in the square Fc/V.1. Evidence for this can be derived from the lowest lying tholos as well as numerous small finds¹². Furthermore, the location of trench D next to trench C can be determined by means of the graves 47, 48 and 54 as being in square Fd/IV.4 and Fd/IV.5¹³. Grave 58 (= burial J in the notebook)¹⁴ is to be localized in trench F (in the notebook) and to square Fc/V.2 in the publication. Trench J is situated next to trench F. The exact location of trenches G and H is uncertain. Trench E may be located in the vicinity of trench D¹⁵.

The stratigraphic evidence for the sealings from the 'outlying areas' is extremely limited and does not allow for exact dating. One exception, however, is a sealing from trench E (No. 16) which

⁷ Cf. Mallowan/Rose 1935: p. 15.

⁸ Cf. Tobler 1950: Pl. CXLV:385-388.

⁹ The site plan and the aerial photo (Mallowan/Rose 1935: fig. 3; Pl. II) provide the only information aside from the field notebook stored in the British Museum.

¹⁰ Cf. Hijara and others 1980: p. 136 fig. 2. Compare the site plan with Mallowan/Rose 1935: fig. 3.

¹¹ My thanks are due to S. Campbell for additional information concerning the localization of the trenches.

¹² An amuletic seal (field no. A 22; I.M. 15041) was found for example 'outside the temenos chamber, trench C -3.2m'. Cf. Mallowan's note for the same seal: Mallowan/Rose 1935: p. XII, 13.

¹³ Grave G 47 can be equated with burial 4 in the notebook, G 48 with burial 5, and G 54 with burial 1. For the publication of these graves cf. Mallowan/Rose 1935: 41f.

¹⁴ This correspondence is evident through the grave offerings and their field numbers. Cf. Mallowan/Rose 1935: 42f.

¹⁵ Personal communication of S. Campbell.

was found in a stratum containing almost exclusively Halaf pottery.

Most of the sealings from the 'outlying areas' were found at a depth of less than 2 metres. The pottery from these strata between 0 and 2 metres sub surface is a mixture of predominantly Halaf and 'Ubaid sherds. In addition, Mallowan notes the presence of Assyrian pottery in trenches A, B, C and D in his field notebook. Our investigation of the Arpachiyah pottery from these trenches in the Institute of Archaeology collection has shown that sherds from the Ninevite 5 and Gawra periods were also present.

A synchronism between the sealings from the well of level TT 4 on the akropolis and the sealings from trench G might be indicated by impressions of presumably the same round stamp seal occurring in both areas (No. 3 and No. 7). Unfortunately, we were not able to examine these pieces first hand as they are located in the Iraq Museum.

The post-Halaf sealings (Nos. 1-8; 10-15) published by Mallowan were associated by him with sealings from level 3 of the deep sounding at Nineveh¹⁶. Because of their find spots in the upper layers of the mound (TT 1-4) and of the 'outlying areas', Mallowan proposed a date in the 'Ubaid period for these sealings. Based on the pottery from Arpachiyah in the Institute of Archaeology, which was not published by Mallowan, later levels dating to the Gawra and Ninevite 5 periods must have existed. The poor remains of the building levels TT 1-4 were already badly eroded at the time of excavation, so that no traces of architecture of later levels were detected¹⁷. The existence of later building levels is, however, attested by a significant amount of Gawra period pottery (Pl. VI) and Ninevite 5 sherds¹⁸ as well as a cylinder seal impression with geometric design (No. 71; Fig. 5:9; Pl. IV:14). The find spots of the post-Halaf sealings do not provide any firm evidence for an association with the 'Ubaid levels TT 2-4. They all could easily have been washed down from the upper levels, or, in the case of the well, been discarded from upper levels. The exact dating of the post-Halaf sealings can therefore be determined only on stylistic grounds.

2. Sealings of the Halaf Period

Two types of sealings are represented amongst the sealed clay objects from the 'burnt house'. First, there are ovoid clay bullae which are formed around a knot¹⁹ and impressed with stamp seals on all sides (Pl. I:1-3). Second, circular to oval clay discs with no traces of a rope attachment and sealed on one side only are present (Fig. 2:6). The majority of the clay sealings (14 pieces) bear impressions of a hand-shaped seal pendant with a star-like central motif and fine lines indicating the lines of the hand (Fig. 1:1). Comparable impressions can be found on three further sealings which unfortunately lack any information regarding their find spots (Fig. 1:3, 4, 6; Pl. II:5). Two

¹⁶ Mallowan/Rose 1935: p. 98. For the sealings from the deep sounding in Nineveh see Thompson/Mallowan 1933: Pl. LXIV, and von Wickede 1990: 191ff.

¹⁷ Cf. Mallowan/Rose 1935: 11ff.

¹⁸ The incised Ninevite 5 sherds are very thin-walled, consisting of greenish-grey clay and fired at high temperature. For pottery comparable to the incised, excised or painted sherds from Arpachiyah see pieces from Nineveh: Thompson/Mallowan 1933: Pls. LVI:8, 9, 14, 17; LVII:2, 5; LVIII:9 10; LXII:10, 11, 15, 19; LXIII:2, 3. On the problems of dating the different styles of Ninevite 5 pottery cf. recently Roaf/Killick 1987: 199ff.

¹⁹ In some cases the carbonized remains of the knot are still preserved, for example No. 26 (Fig. 1:5).

of these three pieces, a clay bulla and a clay disc, are blackened by fire like the sealings from the 'burnt house'. The third piece, an unfired, rough lump of clay with a single seal impression (Fig. 1:4), clearly does not come from the 'burnt house'. It appears to be a discarded piece of clay which did not serve as a sealing. Apart from the hand-shaped seal impressions, there are impressions of other typical Halaf seal pendants with fine linear designs and star-like motifs on clay bullae and clay discs from the 'burnt house' (Fig. 2:4, 6, 7; Pl. II:1-3). Of particular interest here are a clay bulla (Fig. 2:4; Pl. II:1a-c) and disc (No. 44)²⁰ each bearing multiple impressions of two different seals. In contrast, impressions of the hand-shaped seal pendant never appear together with impressions of other seals. The great number of hand-shaped seal impressions occurring on clay bullae and discs seems to stand in direct relationship to the 'burnt house' and the significant location and size of this building. The abundance of small finds and pottery in the 'burnt room' as well as their scattered distribution on the floor and the undamaged condition of most of the bullae (Pl. I:1-3) seem to indicate that goods were sealed and stored there. In the case of the hand-shaped seal pendant, it can be assumed that it belonged to a person of high status, probably in charge of the 'burnt house', i.e., the main building of the late Halaf level TT 6. The 'burnt house' might have been the workshop (manufacturing area) and storehouse for all precious goods, such as jewellery, figurines, amulets and the fine luxury, polychrome Halaf pottery from the 'burnt room'²¹. Unfortunately, no original stamp seal exactly resembling the hand-shaped impressions was found²². However, other original seals from Arpachiyah, including the 'burnt room', correspond to impressions on the remaining bullae and clay discs (Fig. 2:4a, 6; Pl. II:1a, 2a-b; No. 44)²³. Whether there is an exact correspondence between the original seals and the seal impression cannot be determined, however, since the pieces are located in different collections in London and Baghdad.

In addition to the corpus of sealings from the 'burnt house', there are further Halaf sealings from Arpachiyah. With the exception of a single piece (Fig. 2:3; Pl. II:7), the stratigraphic context of these sealings is not certain (Fig. 2:1, 2, 5, 8, 10, 11; Pl. II:4, 6, 8-10). Their dark brown colour, the tempering material used in the clay, as well as the stylistic features of the seal impressions indicate a date in the Halaf period. The geometric seal designs consisting of star-like motifs, fine drill-holes and fine lines are all characteristic of Halaf period glyptic²⁴. None of the seal impressions of the Halaf period from Arpachiyah show figurative designs. This could be purely incidental, however, for representations of animals are attested in Halaf glyptic²⁵.

The Halaf seal impressions from Arpachiyah occur on different types of sealings. Most common are the ovoid clay bullae which hung from a string attached to a container of some kind (Pls. I:1-3; II:1, 3, 5). Another type of sealing is a flat tag (not to be confused with the clay discs) which was also fastened by string to a container. One of the sealings has textile impressions on its reverse (Fig. 2:3; Pl. II:7) which indicates that goods wrapped in cloth (bundles or sacks?) were

²⁰ Cf. von Wickede 1990: Pl. 60a-b.

²¹ Cf. Mallowan/Rose 1935: 104ff.; Pls. VIb; Xa; XI; XIIb; XIII-XV.

²² For other hand-shaped seal pendants from Arpachiyah cf. von Wickede 1990: Pls. 159-160.

²³ Cf. von Wickede 1990: p. 96.

²⁴ Cf. von Wickede 1990: 94ff., especially p. 97.

²⁵ Cf. von Wickede 1990: Pls. 81-83.

also sealed. Among the Halaf sealings, not one can be identified as a jar sealing. The jar sealings typical for the post-Halaf levels (compare Figs. 4:6; 5:8) are missing in the Halaf material. Possibly the small clay discs (Figs. 1:6; 2:6) can be interpreted as jar lids²⁶. The diameter of these clay discs, however, is less than 5 cm and not suited to cover the mouth of Halaf vessels. The circular to oval clay discs are, contrary to the bullae, always carefully sealed without overlaps and perhaps could have served as a kind of counterfoil or receipt. This might well be the case for one of the clay discs (No. 44) which bear the impressions of two different stamp seal pendants. It was presumably sealed by two persons for control or receipt purposes.

The fact that impressions of many different Halaf seals occur on clay sealings in Arpachiyah raises interesting questions. Two possible interpretations of this evidence are: 1) many persons in Arpachiyah (each with a personal seal) were authorized to seal goods stored in the 'burnt house'; 2) some of the goods or raw materials (also present in the inventory of the 'burnt room') were sealed and brought from outside of Arpachiyah, e.g. from nearby Nineveh. The Halaf period sealings from Arpachiyah are of great importance, because they attest to a complex and controlled trade network as well as to early attempts in administration in the fifth millennium B.C.

3. Sealings of the Gawra Period

The later group of sealings from Arpachiyah dates to the late chalcolithic period²⁷. In contrast to the material of the Halaf period, the seal impressions of the later group show mostly figured designs. The few geometric and plant motifs (Fig. 5:1, 2, 5; Pl. IV:5) differ, with the exception of No. 22, from those of Halaf glyptic. Instead, these seal impressions with cross-hatched ovals, branches and the jagged star are closely related to 'Ubaid motifs from Tepe Gawra and Degirmentepe²⁸. The double-line border (Fig. 5:2) as well as the lozenge border (Fig. 5:5) of two seal impressions indicate an even later date in the Gawra period, which is contemporary with the early and middle Uruk period in southern Mesopotamia. The lozenge band recalls a snake representation of the Gawra period (Fig. 6:2).

Earlier 'Ubaid features are present in the representation of a wild boar whose body shows interior hatching (Fig. 4:2; Pl. IV:1). The cross-hatching of animal bodies is a characteristic of the late 'Ubaid seal impressions from Degirmentepe²⁹. However, depictions of wild boars are completely unknown in the 'Ubaid period³⁰. The rounded body not only offers a comparison to dated pieces of the Gawra period (Pl. V:4)³¹, it also has an almost identical counterpart on a sealing showing a galloping animal with the same interior hatching of the body (Fig. 6:3). The exact find spot of this piece from Tepe Gawra is unknown, so that we are unable to date it more exactly within the Gawra period.

²⁶ This suggestion is recorded in Mallowan's field notebook.

²⁷ Cf. von Wickede 1990: 136f.; 186ff.

²⁸ Cf. Tobler 1950: Pl. CLXI:48-49, 52-53, 56-60; Esin 1983: p. 189 fig. 9:6; von Wickede 1990: Pls. 333-336.

²⁹ Cf. Esin 1985: p. 260 fig. 16; von Wickede 1990 Pl. 349.

³⁰ Cf. von Wickede 1990: p. 160; 267. The representation from Arpachiyah was described by Buchanan 1967: p.271 as a bear. This does not seem plausible because of the bristles on the animal's back.

³¹ For the same seal but from the 'round house' of Tepe Gawra XIA see von Wickede 1990: Pls. 271; 276. Cf. also Tobler 1950: Pl. CLXIX:161.

The following comparisons illustrate the close relationship between the sealings from Arpachiyah and those of the Gawra period from Tepe Gawra XIA-X (especially XI/XA³²). Parallels are offered by the so-called 'saluki'-dog representations (Pl. III:2a-b) which are characteristic for the glyptic of the Gawra period³³. Further close comparisons to the glyptic from Tepe Gawra XI-X are provided by the snake (compare Fig. 5:6-7 with Fig. 6:2) and ibex representations (compare Fig. 4:5 with Pl. V:1). The folded legs of the ibex are paralleled on another sealing from Tepe Gawra (Pl. V:3). Furthermore, this sealing from Tepe Gawra has a filling motif, which appears to be a ram's head and compares with that of another seal impression from Arpachiyah (Pl. III:1a-b). Ibex and moufflon heads serving both as main and filling motifs, belong to the standard repertoire of Gawra period glyptic³⁴. The erroneous interpretation of the ram's head as a spouted vessel (compared with pottery of level VII-VI from Warka) led Buchanan to the false conclusion that Gawra XII is not much earlier or even contemporary with Warka VIII-VI³⁵. In addition to the incorrect interpretation of the filling element, it is moreover uncertain if this sealing belongs to Gawra XII at all. The sealing can be dated with certainty on stylistic grounds to the Gawra period (Gawra XIA-X), but not to the outgoing 'Ubaid period, also called transitional 'Ubaid/Gawra phase (Gawra XII)³⁶.

Besides animal heads, vultures also appear frequently above a sheep or a goat on sealings from Arpachiyah (Fig. 3:1-3; Pls. III:3a-b; IV:8-9) as well as from Tepe Gawra (Pl. V:1). Several dated examples were also found in level XI/XA of Tepe Gawra³⁷. A seal impression of this type from Gawra VIII³⁸ could be evidence for the continued use of a Gawra period stamp seal in the late Uruk period. Two further sealings from Arpachiyah (Nos. 3; 7), which probably bear impressions of the same seal with this theme, offer the closest parallels to the above-mentioned pieces from Tepe Gawra. A further motif occurring in both Arpachiyah and Tepe Gawra consists of two superimposed animals in front of a hurdle (No. 5; Fig. 6:1; Pl. V:2).

In addition to the modelled animal representations discussed above, there are also stylized, linear animal representations from Arpachiyah. These consist of very slender caprids either arranged *tête-bêche* (No. 11; Fig. 4:6; Pl. IV:11) or appearing as a single motif in standing position (Fig. 4:1; Pl. IV:10). These examples illustrate the fact that different stylistic groups are present in the glyptic of Arpachiyah. The similar case is true for the contemporary glyptic from Tepe Gawra XI/XA³⁹. A third style is characterized by the cross-hatching of animal bodies (Figs. 4:2; 6:3). This distinctive feature occurs only once at both sites, and therefore seems to be nonlocal.

The Gawra period sealings from Arpachiyah attest to close contacts with Tepe Gawra. The seal impressions can best be compared to seal material from Gawra levels XI/XA and X⁴⁰ (Fig.

³² Stratum XI and XA belong to the same level XI/XA. Cf. Rothman 1989: 284ff.

³³ Cf. Buchanan 1967: p. 269; Porada 1965: p. 147; for the dating of the 'saluki'-representations cf. recently von Wickede 1990: 160ff.

³⁴ Cf. Tobler 1950: Pls. CLXIX:166-169; CLXX:170-172.

³⁵ Cf. Buchanan 1967: p. 270; 277 Fig. 3.

³⁶ For the uncertain find spots of most of the sealings from Tepe Gawra as well as for the dating of the sealings and levels cf. von Wickede 1990: 126ff.; 152ff.

³⁷ Cf. von Wickede 1990: Pls. 293; 296.

³⁸ Cf. von Wickede 1990: Pl. 315.

³⁹ Cf. for example von Wickede 1990: Pls. 293; 296.

⁴⁰ Unfortunately, the sealings attributed to Gawra X are poorly stratified.

6:1-3; Pl. V:1-4). This chronological assessment is confirmed by Gawra period impressed pottery from Arpachiyah (Pl. VI), which corresponds to the impressed ware from Tepe Gawra XI/XA in that the rosette decoration is impressed and not applied as is the case with the earlier Gawra ware from level XIA⁴¹. Close relations between Arpachiyah and Tepe Gawra are confirmed not only by the parallels between specific seal motifs, but also by Rothman's⁴² results in neutron activation analysis of sealings from Arpachiyah and Tepe Gawra. The investigation of the clay seems to indicate direct trade relations between both sites. Trade relations may also be indicated by sealings from Tell Qalinj Agha⁴³ (close to Arbil) and Tell Brak⁴⁴. Surprisingly, sealings from Nineveh do not show any signs of contact with the neighbouring site of Arpachiyah. This may partly be due to the later date of the sealings from the deep sounding in Nineveh⁴⁵. Influence of Gawra glyptic may also possibly have reached southern Mesopotamia, as a single, stratified sealing from Warka XII seems to indicate⁴⁶. The seal impression on this sealing depicting six animal heads, presumably gazelles, is closely related to the glyptic of levels XIA-XI/XA in Tepe Gawra where rows of animal heads are a common seal motif⁴⁷. In fact, it would appear that a number of seal motifs of the late Uruk period, as for example scenes with prisoners or representations of small crouching human figures, originated in the north as early examples in the glyptic of Tepe Gawra demonstrate⁴⁸. The seal material of the Gawra period from Arpachiyah and Tepe Gawra shows the importance of the glyptic of the north, which until now was always considered under the aspect of Uruk glyptic. Because of the distinctive Gawra glyptic and the wide distribution of the Gawra incised and impressed wares⁴⁹ the use of the term 'Uruk' for the Gawra period does not appear valid. It would seem more appropriate in northern Mesopotamia to limit the term 'Uruk' to the late Uruk period following the Gawra period, when true Uruk pottery becomes abundant in the North.

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All the photographs of the pieces in the Collection of the Department of Western Asiatic Archaeology in the Institute of Archaeology were taken by Peter Dorrell.

⁴¹ The differentiation between level XIA and XI/XA pottery was shown by Rothman 1988: 141f.; cf. also von Wickede 1990: p. 133; 137.

⁴² Cf. Rothman 1988: 577f., and Rothman 1989: p. 286 with note 13.

⁴³ Cf. Abu al-Soof 1969: Pl. XX (top right), and von Wickede 1990: p. 211; Pl. 480.

⁴⁴ Cf. Oates 1985: Pls. XXVd; XXXa, and von Wickede 1990: 193f.

⁴⁵ On the problem of dating the sealings from the deep sounding see von Wickede 1990: 191ff.; fig. 37.

⁴⁶ Cf. von Wickede 1990: p. 213; Pl. 482; Amiet 1980: Pl. 8, 160.

⁴⁷ See note 34.

⁴⁸ For the representations of human figures in the Gawra period cf. von Wickede 1990: Pls. 280-284; 298-303.

⁴⁹ For the distribution of these Gawra wares from northern Iraq through northern Syria to the Keban region see von Wickede 1990: 134ff. Recently Gawra impressed and incised pottery has also been found in the 'early Uruk' levels of Tell Brak: Cf. J. Oates 1985: 177f.; 186; Pl. XXXIb.

List of Photographs:

1. Courtesy of the Department of Western Asiatic Archaeology, University College London, University of London, Institute of Archaeology: Plates II:1-10; IV:1-14; VI.
2. Courtesy of the Trustees of the British Museum, London: Plates I:1a-3a and III:1a-3a.
3. Courtesy of the University Museum, University of Pennsylvania, Philadelphia: Plate V:1-4.

All the drawings are done by the author except Fig. 6:2 by S. Herbordt and Fig. 6:3 by C. Wolff. Thanks are due to Cornelia Wolff for inking the author's pencil drawings on Plates I:1b-3b; II:1-3, 5, 7, 8, 10, 11; III:2b-3b and Fig. 4:1, 2.

I owe further thanks to Suzanne Herbordt for the English translation of the article.

**List of All Clay Sealings From
Arpachiyah**

Cat. no.	Field no.	Period	Location	Museum no.	Description and reference
1	A 601	Gawra	T.T. 4, Well	I.M. 15095	Impression of a square seal. Same seal as A 602. Cf. Mallowan/Rose 1935: pl. IXa.
2	A 602	Gawra	T.T. 4, Well	I.A.U.L. 53/463	See Fig. 4:5; Pl. IV:3.
3	A 603	Gawra	T.T. 4, Well	I.M. 15096	Impression of a round seal. "Vulture" above goat? Cf. Mallowan/Rose 1935: pl. IXa.
4	A 604	Gawra	T.T. 4, Well	B.M. 127699 (1934-2-10, 387)	See Pl. III: 3a-b.
5	A 605	Gawra	Trench C, surface	I.M. 15097	2 impressions of a square seal. Design: 2 superimposed animals before a hurdle. Cf. Mallowan/Rose 1935: pl. IXa, and Buchanan 1967: p. 277 fig. 5.
6	A 606	Gawra	Trench G, surface	B.M. 127700 (1934-2-10, 388)	See Pl. III: 1a-b.
7	A 607	Gawra	Trench G, surface	I.M. 15098	Impression of a round stamp seal. Design: "vulture" over horned goat? Cf. Mallowan/Rose 1935: pl. IXa.
8	A 608	Gawra	Trench F, top metre	I.M. 15099	Impression of a round stamp seal. Design: a recumbent animal in centre; 2 further animals above and below? Cf. Mallowan/Rose 1935: pl. IXa, and Buchanan 1967: p. 277 fig. 10.

Cat. no.	Field no.	Period	Location	Museum no.	Description and reference
9	A 609	Gawra	Trench F? Top metre	I.A.U.L. 53/464	See Fig. 4:2; Pl. IV:1
10	A 610	Gawra	Trench G, -1.7m	I.A.U.L. 53/469	See Fig. 4:6; Pl. IV: 11
11	A 611	Gawra	Trench G, -1.7m	I.M. 15100	Impression of a round seal on a tongue-shaped clay strip. Design: 2 horned goats, <i>tête-bêche</i> . Probably the same seal as A 610. Cf. Mallowan/Rose 1935: pl. IXa.
12	A 612	Gawra	Trench D, - 0.5m	B.M. 127702 (1934-2-10, 390)	See Pl. III: 2a-b
13	A 613	Gawra	Trench D, - 0.5m	I.M. 15101	Impression of a round stamp seal. Design: goat with head turned back? Cf. Mallowan/Rose 1935: pl. IXa.
14	A 614a	Gawra		I.M. 15102	Impression of a round stamp. Same seal as A 614b. Cf. Mallowan/Rose 1935: pl. IXa.
15	A 614b	Gawra		I.A.U.L. 53/465	See Fig. 4: 3; Pl. IV: 2.
16	A 615	Halaf	Trench E, west, - 2m	I.A.U.L. 53/466	See Fig 2: 3; Pl. II: 7.

Cat. no.	Field no.	Period	Location	Museum no.	Description and reference
17	A 615	Halaf	Terrace T.T.	I.A.U.L. 53/466	See Fig. 2: 10; Pl. II: 9.
18	A 615	Halaf	loose in soil	I.M. 15103	Impression of a seal-pendant or a round stamp seal. Linear design. Cf. Mallowan/ Rose 1935: pl. IXa (3rd row), and von Wickede 1990: pl. 70
19	A 615	Halaf	loose in soil	I.M. 15103	2 impressions of a rounded seal or pendant on a flat clay disc. Rectilinear design. Cf. Mallowan/ Rose 1935: pl. IXa (4th row, 3rd from left), and von Wickede 1990: pl. 79.
20	A 615	Halaf	loose in soil	I.M. 15103	Concave impression of an oval seal or pendant. Chequerboard design with cross-hatching. Cf. Mallowan/ Rose 1935: pl. IXa (4th row, 2nd from right), and von Wickede 1990: pl. 71
21	A 615	Halaf	loose in soil	B.M. 127692	Impression of a round stamp seal. Linear design. Cf. Mallowan/ Rose 1935: pl. IXa (4th row, 1st from right), and von Wickede 1990: pl. 73.
22	A 616	'Ubaid?	T.T. 2	I.M. 15104	3 impressions of a circular seal. Sun-like motif. Cf. Mallowan/ Rose 1935: pl. IXa, and von Wickede 1990: pl. 416.

Cat. no.	Field no.	Period	Location	Museum no.	Description and reference
23	A 617	Halaf	T.T. , loose in soil	I.M. 15105	Clay bulla/ tag with 2 impressions of a convex drop-shaped seal-pendant. Chequerboard design with cross-hatching. Cf. Mallowan/ Rose 1935: pl. IXa, and von Wickede 1990: pl. 69.
24	A 618	Halaf	T.T. , - 3.0m, from pit by stones	B.M. 127693 (1934-2-10, 381)	Clay bulla with 4 impressions of a rounded seal. Lattice pattern. Cf. Mallowan/ Rose 1935: pl. IXa, and von Wickede 1990: pl. 68.
25	A619	Halaf	T.T. 6, burnt house	I.A.U.L. 53/467	See Fig. 1: 2.
26	A619	Halaf	T.T. 6, burnt house	I.A.U.L. 53/1325	See Fig. 1: 5
27	A619	Halaf	T.T. 6, burnt house	I.A.U.L. 53/467	See Fig. 1: 7
28	A619	Halaf	T.T. 6, burnt house	I.A.U.L. 53/467	See Fig. 2: 4a-c; Pl. II: 1a-c
29	A619	Halaf	T.T. 6, burnt house	I.A.U.L. 53/467	See Fig. 2: 7; Pl. II 3a-c
30	A619	Halaf	T.T. 6, burnt house	I.A.U.L. 53/467	See Fig. 2:9

Cat. no.	Field no.	Period	Location	Museum no.	Description and reference
31	A 619	Halaf	T.T. 6, burnt house	B.M. 127695 (1934-2-10, 383)	See Pl. I: 1a-b
32	A 619	Halaf	T.T. 6, burnt house	B.M. 127701 (1934-2-10, 389)	See Pl. I: 2a-b
33	A 619	Halaf	T.T. 6, burnt house	B.M. 127696 (1934-2-10, 384)	See Pl. I: 3a-b
34	A 619	Halaf	T.T. 6, burnt house	I.M. 15185	Clay bulla with multiple oval impressions. Design like Fig. 2: 1. Cf. Mallowan/Rose 1935: pl. IXb (2nd row, 6th from left), and von Wickede 1990: pl. 61.
35	A 619	Halaf	T.T. 6, burnt house	I.M. 15185	Clay bulla with multiple impressions of hand-shaped pendant. Cf. Fig. 1: 1 and Mallowan/Rose 1935: pl. IXb (1st row, 3rd from left).
36	A 619	Halaf	T.T. 6, burnt house	I.M. 15185	Same as Cat. no. 35? Cf. Mallowan/Rose 1935: pl. IXb (1st row, 6th from left),
37	A 619	Halaf	T.T. 6, burnt house	I.M. 15185	Same as Cat. no. 35? Cf. Mallowan/Rose 1935: pl. IXb (1st row, right)
38	A 619	Halaf	T.T. 6, burnt house	I.M. 15185	Same as Cat. no. 35. Cf. Mallowan/Rose 1935: pl. IXb (2nd row, 1st from left),

Cat. no.	Field no.	Period	Location	Museum no.	Description and reference
39	A 619	Halaf	T.T. 6, burnt house	I.M. 15185	Same as Cat. no. 35. Cf. Mallowan/ Rose 1935: pl. IXb (2nd row, 5th from left).
40	A 619	Halaf	T.T. 6, burnt house	I.M. 15185	Same as Cat. no. 35. Cf. Mallowan/ Rose 1935: pl. IXb (2nd row, right).
41	A 619	Halaf	T.T. 6, burnt house	I.M. 15185	Clay bulla with multiple rounded impressions. Linear design. Cf. Mallowan/ Rose 1935: pl. IXb (3rd from left).
42	A 619	Halaf	T.T. 6, burnt house	I.M. 15185	Clay bulla with multiple oval impressions. Linear design.
43	A 620	Halaf	T.T. 6, burnt house	I.A.U.L. 53/468	See Fig. 2: 6; Pl. II: 2a-b.
44	A 620	Halaf	T.T. 6, burnt house	B.M. 127697 (1934-2-10, 385)	Clay disc with 5 impressions of 2 different seal- pendants: sickle and drop-shaped. Linear design. Cf. Mallowan/ Rose 1935: pl. IXb (3rd row, 3rd from left), and von Wickede 1990: pl. 60a-b.
45	A 620	Halaf	T.T. 6, burnt house	B.M. 127698 (1934-2-10, 386)	Unbaked clay disc with 4 oval impressions, probably from a seal-pendant. Design: Star-like motif. Cf. Mallowan/ Rose 1935: pl. IXb (3rd row, 2nd from left), and von Wickede 1990: pl. 66.
46	A 620	Halaf	T.T. 6, burnt house	I.M. 15184	Small clay disc with hand-shaped seal impression. Cf. Mallowan/ Rose 1935: pl. IXb (3rd row, 4th from left), and von Wickede 1990: pl. 59.

Cat. no.	Field no.	Period	Location	Museum no.	Description and reference
47	A 620	Halaf	T.T. 6, burnt house	I.M. 15184	Small clay disc. 2 impresions of hand-shaped seal. Cf. Fig. 1:1 & Mallowan and Rose 1935: pl. IXb (3rd row, right), and von Wickede 1990: pl. 58.
48	A 620	Halaf	T.T. 6, burnt house	I.M. 15184	Clay disc with 3 trapezoidal seal impressions. Lattice pattern? Cf. Mallowan/ Rose 1935: pl. IXb (3rd row, left).
49	A 620	Halaf	T.T. 6, burnt house	I.M. 15184	Clay disc with 3 rectangular seal impressions. Cross-hatching as design. Cf. von Wickede 1990: pl. 62.
50	A 620	Halaf	T.T. 6, burnt house	I.A.U.L 53/468	Chaff-faced lump of clay; string marks (?) but no seal impression.
51	.....	Halaf		I.A.U.L 53/1324	See Fig. 1: 3; Pl. II: 5a-b.
52	.....	Halaf		I.A.U.L 53/1324	See Fig. 1:4.
53	.....	Halaf		I.A.U.L 53/1324	See Fig. 1:6.
54	.....	Halaf		I.A.U.L 53/491	See Fig. 2:1; Pl. II:6.
55	.....	Halaf		I.A.U.L 53/1324	See Fig. 2:2; Pl. II:8
56	.....	Halaf		I.A.U.L 53/1324	See Fig. 2:5

Cat. no.	Field no.	Period	Location	Museum no.	Description and reference
57	Halaf		I.A.U.L. 53/1324	See Fig. 2:8; Pl. II:4.
58	Halaf	Trench F, - 1.2m	I.A.U.L. 53/1324	See Fig. 2:11; Pl. II: 10.
59	Gawra		I.A.U.L. 53/1324	See Fig. 3:2; Pl. IV: 8a-b.
60	Gawra		I.A.U.L. 53/1324	See Fig. 3:3; Pl. IV: 9a-b.
61	Gawra		I.A.U.L. 53/444	See Fig. 4:1; Pl. IV: 10.
62	Gawra		I.A.U.L. 53/1324	See Fig. 4: 4.
63	Gawra		I.A.U.L. 53/1324	See Fig. 5: 1.
64	Gawra	Trench A, - 1.4m	I.A.U.L. 53/445	See Fig. 5:2; Pl. IV: 5.
65	Gawra	T.T., surface	I.A.U.L. 53/492	See Fig. 5:3; Pl. IV:4.
66	Gawra	Trench C-D, - 1m?	I.A.U.L. 53/1324	See Fig. 5:4; Pl. IV: 12.
67	Gawra		I.A.U.L. 53/1324	See Fig. 5:5.
68	Gawra	Trench G, - 2.0m?	I.A.U.L. 53/1324	See Fig. 5:6; Pl. IV: 6.
69	Gawra		I.A.U.L. 53/1324	See Fig. 5:7; Pl. IV: 7.
70	Gawra?	T.T. 2	I.A.U.L. 53/1324	See Fig. 5:8; Pl. IV: 13.
71	Ninevite 5		I.A.U.L. 53/1324	See Fig. 5:9; Pl. IV: 14.

Catalogue of Illustrated Objects

Fig. 1.

1. Reconstruction of seal design according to Pls. I:1a-3a; II:5a-b and Fig. 1:2-7. Cf. von Wickede 1990: Pl. 57.

2. Fragmentary clay bulla/tag (3.6 x 2.8 x 1.3 cm). Three or two impressions of a hand-shaped seal-pendant on obverse and reverse respectively. Arpachiyah, A 619. Level TT 6, burnt house. London, I.A.U.L. Reg. no. 53/467. Cat. no. 25.

3. Oval clay bulla (l. 5.3 cm; d. 2.1 cm); only half preserved. Four impressions of a hand-shaped seal-pendant present. Arpachiyah. No field number. London, I.A.U.L. Reg. no. 53/1324. Cf. also here Pl. II:5a-b. Cat. no. 51.

4. Unbaked lump of clay (5.4 x 3.5 cm) with a single impression of a hand-shaped seal-pendant. No string marks. Arpachiyah. No field number. London, I.A.U.L. Reg. no. 53/1324. Cat. no. 52.

5. Frag. oval clay bulla (l. 5.0 cm; d. 2.5-2.7 cm). Marks of four strings and carbonized remains of knot still in interior visible. Nine impressions of a hand-shaped seal-pendant preserved. Arpachiyah, A 619. Level TT 6, burnt house. London, I.A.U.L. Reg. no. 53/1325. Cat. no. 26.

6. Frag. clay disc (ext. d. 2.8 cm; th. 1.0 cm). One impression of a hand-shaped (?) seal-pendant preserved. No string marks. Arpachiyah. No field number. London, I.A.U.L. Reg. no. 53/1324. Cat. no. 53.

7. Frag. clay bulla/tag (l. 3.1 cm; d. 2.0 cm). Three (originally four?) impressions of a hand-shaped seal-pendant preserved. Arpachiyah, A 619 Level TT 6, burnt house. London, I.A.U.L. Reg. no. 53/467. Cf. Mallowan/Rose 1935: Pl. IXb (2nd row, 2nd from left). Cat. no. 27.

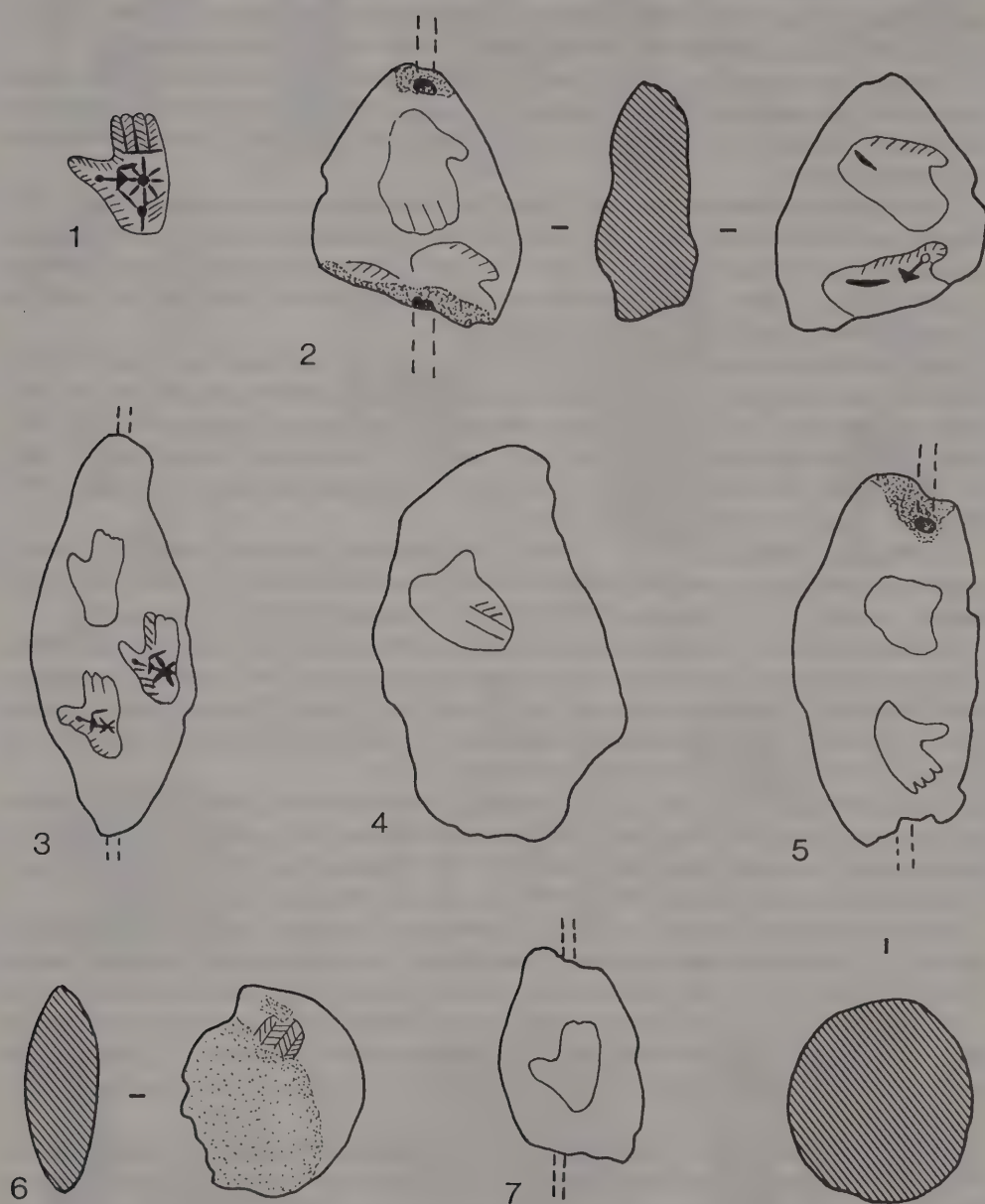


Fig. 1. Seal impressions from Arpachiyah. Halaf period. Scale 1: 1

Fig. 2.

1. Chaff-tempered lump of clay (3.0 x 1.9 x 1.6 cm). One impression of a drop-shaped seal-pendant (d. c. 1.0 cm) with rectilinear design. Arpachiyah. No field number. London, I.A.U.L. Reg. no. 53/491. Cf. von Wickede 1990: Pl. 75a-b. Cf. also here Pl. II:6. Cat. no. 54.

2. Frag. clay sealing (3.4 x 2.0 x 1.1 cm). Part of reverse is flat, while the rest shows several string marks. Impression of a seal-pendant or stamp seal with rectilinear design. Arpachiyah. No field number. London, I.A.U.L. Reg. no. 53/1324. Cf. von Wickede 1990: Pl. 76a-b. Cf. also here Pl. II:8. Cat. no. 55.

3. Frag. chaff-tempered clay sealing (3.0 x 2.7 cm). Reverse shows cloth marks (sack?). One impression of a square stamp seal (1.6 x 1.5 cm) with cross-hatched lozenge and zig-zag design. Arpachiyah, A 615. Found 'at -2.0 m E. W.' (i.e. trench E, West, 2m below surface). London, I.A.U.L. Reg. no. 53/466. Cf. Mallowan/Rose 1935: Pl. IXa (4th row, 4th from left), and von Wickede 1990: Pl. 74. Cf. also here Pl. II:7. Cat. no. 16.

4a-c. Ovoid clay bulla (l. 4.5 cm; d. 2.2-2.3 cm) with ten seal impressions made by two different seals. Four impressions are from a longitudinal drop-shaped seal-pendant (Fig. 4b), while the remaining six could be from a tiny convex drop-shaped seal-pendant (Fig. 4a). Rectilinear and cross design. Arpachiyah, A 619. Level TT 6, burnt house. London, I.A.U.L. Reg. no. 53/467. Cf. Mallowan/Rose 1935: Pl. IXb (top row, 4th from left), and von Wickede 1990: Pl. 65. Cf. also here Pl. II:1a-c. Cat. no. 28.

5. Frag. clay sealing (2.7 x 1.8 x 1.0 cm). Reverse shows two canals with string marks. Impression probably of an oval seal-pendant. Rectilinear and drilled design. Arpachiyah. No field number. London, I.A.U.L. Reg. no. 53/1324. Cf. von Wickede 1990: Pl. 72. Cat. no. 56.

6. Frag. clay disc (d. 3.7 cm; th. 1.6 cm). No string marks visible. Two impressions of a three-sided seal-pendant with curved sides. Rectilinear design consisting of a chequerboard pattern filled with dashes; above a star-like motif. Arpachiyah, A 620. Level TT 6, burnt house. London, I.A.U.L. Reg. no. 53/468. Cf. Mallowan/Rose 1935: Pl. IXb (3rd row, 2nd from right), and von Wickede 1990: Pl. 63. Cf. also here Pl. II:2a-b. Cat. no. 43.

7. Clay bulla (ext. l. 4.1 cm; d. 2.5-3.0 cm); lower part broken off. Nine impressions of an oval stamp seal or pendant. Rectilinear design and star-like motif. Arpachiyah, A 619. Level TT 6, burnt house. London I.A.U.L. Reg. no. 53/467. Cf. Mallowan/Rose 1935: Pl. IXb (2nd row, 4th from left), and von Wickede 1990: Pl. 64. Cf. also here Pl. II:3a-c. Cat. no. 29.

8. Frag. clay sealing (2.5 x 1.7 x 0.7 cm). Reverse with flat surface and several string marks like Fig. 2:2. One seal impression with rectilinear design. Arpachiyah. No field number. London, I.A.U.L. Reg. no. 53/1324. Cf. von Wickede 1990: Pl. 77a-b. Cf. also here Pl. II:4. Cat. no. 57.

9. Frag. clay tag (2.7 x 1.8 x 1.0 cm). Marks of string and knot at the top. Impression of stamp seal (1.0 x 0.7 cm)? Design not recognizable. Arpachiyah, A 619. Level TT 6, burnt house. London, I.A.U.L. Reg. no. 53/467. Cf. Mallowan/Rose 1935: Pl. IXb (2nd row, 2nd from right?). Cat. no. 30.

10. Frag. clay disc (ext. 3.1 x 2.3 cm; th. 1.0 cm). Impression of a rectangular stamp seal (1.6 x 1.3 cm) with cross-hatched design. Arpachiyah, A 615. From 'Terrace T.T.' (i.e. Trench on Tepe). London, I.A.U.L. Reg. no. 53/466. Cf. Mallowan/Rose 1935: Pl. IXa (4th row, 3rd from right), and von Wickede 1990: Pl. 67. Cf. also here Pl. II:9. Cat. no. 17.

11. Round clay tag (d. 2.9-3.4 cm; th. 0.9 cm). Seal impression with rectilinear design. Arpachiyah. No field number. Trench F, 1.2 m below surface. London, I.A.U.L. Reg. no. 53/1324. Cf. von Wickede 1990: Pl. 78. Cf also here Pl. II:10. Cat. no. 58.

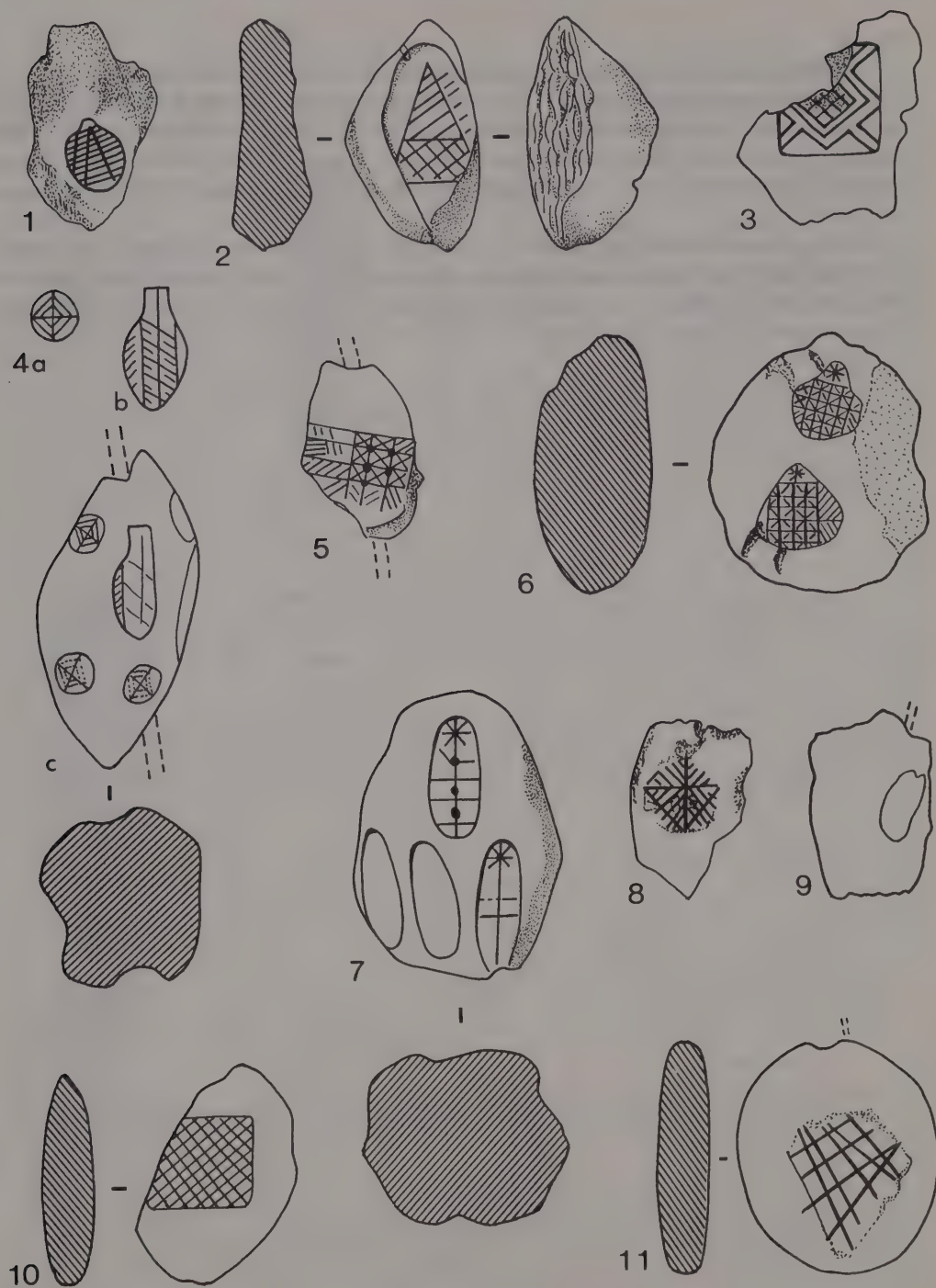


Fig. 2. Seal impressions from Arpachiyah. Halaf period. Scale 1: 1

Fig. 3.

1. Reconstruction of seal design according to Pls. III:3a-b; IV:8-9 and Fig. 3:2, 3.
2. Frag. tongue-shaped clay strip (ext. l. 4.8 cm; w. 2.7 cm; th. 1.2 cm). Baked clay, heavily chaff-tempered. Two impressions of a circular stamp seal (d. 1.85 cm) are preserved. Seal design depicts a vulture above a kid. Same seal as in Fig. 3:3. Arpachiyah. No field number. London, I.A.U.L. Reg. no. 53/1324. Cf. von Wickede 1990: Pl. 406a. Cf. also here Pl. IV:8a-b. Cat. no. 59.
3. Frag. tongue-shaped clay strip (ext. l. 7.0 cm; w. 4.5 cm; th. 1.8 cm). Baked clay, heavily chaff-tempered. Three impressions of a circular stamp seal (d. 1.85 cm) depicting a vulture above a kid. Same seal as in Fig. 3:2. Arpachiyah. No field number. London, I.A.U.L. Reg. no. 53/1324. Cf. also here Pl. IV:9a-b. Cat. no. 60.

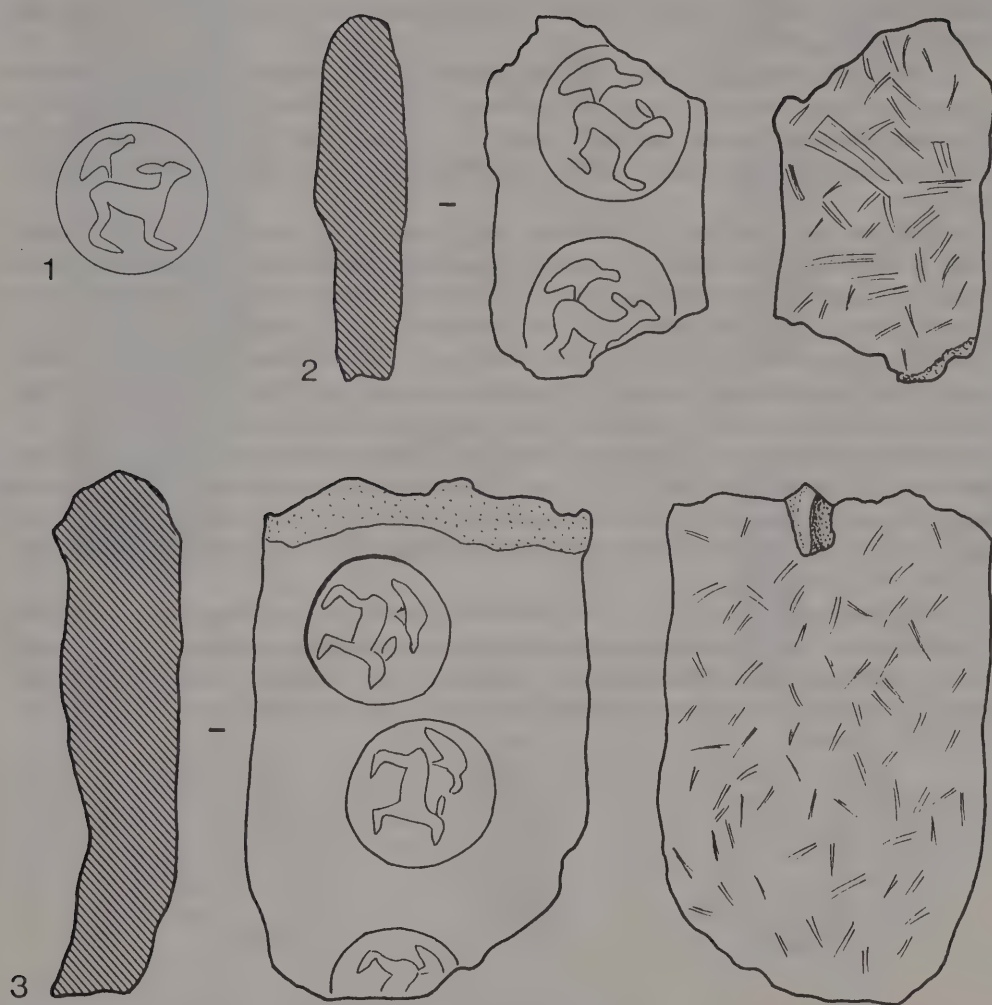


Fig. 3. Seal impressions from Arpachiyah. Early Uruk-Gawra period. Scale 1: 1

Fig. 4.

1. Frag. tongue-shaped clay strip (ext. l. 8.9 cm; w. 4.5 cm; th. 2.4 cm). Chaff-tempered yellowish-brown clay. No string marks. Two impressions of an oval stamp or pearl-shaped seal (c. 2.5 x 1.3 cm) depicting a horned goat and an undetermined filling motif. Arpachiyah. No field number. London, I.A.U.L. Reg. no. 53/444. Cf. von Wickede 1990: Pls. 405; 414. Cf. also here Pl. IV:10. Cat. no. 61.

2. Frag. clay sealing (2.5 x 1.6 x 0.9 cm). Marks of string and knot on reverse. Concave impression of an oval seal (1.7 x 0.9 cm) depicting a wild boar. Arpachiyah, A 609. Found 'in loose soil, probably from top metre of (trench) F'. London, I.A.U.L. Reg. no. 53/464. Cf. Mallowan/Rose 1935: Pl. IXa:609, and von Wickede 1990: Pl. 412. Cf. also here Pl. IV:1. Cat. no. 9.

3. Frag. basket sealing (3.0 x 1.6 x 1.1 cm). Slightly baked, chaff-tempered clay. Reed marks of basket on reverse. Impression of a round seal depicting a quadruped and another animal above its back. Arpachiyah, A 614b. London, I.A.U.L. Reg. no. 53/465. Cf. Mallowan/Rose 1935: Pl. IXa:614b, and von Wickede 1990: Pl. 407. Cf. also here Pl. IV:2. Cat. no. 15.

4. Frag. basket sealing (2.8 x 1.8 x 0.9 cm). Dark grey clay. Reed marks of basket on reverse. Impression of a round seal depicting a horned goat and an undefined motif above its back. Arpachiyah. No field number. London, I.A.U.L. Reg. no. 53/1324. Cat. no. 62.

5. Frag. sealing (2.8 x 2.7 x 1.8 cm). Baked clay. Marks of string and peg (?) on reverse. Impression of square stamp seal (1.8 x 1.7 cm). The impression shows a wild goat, and above it a leaf and an animal head as filling motifs. Arpachiyah, A 602. Level TT 4, well. London, I.A.U.L. Reg. no. 53/463. Cf. Mallowan/Rose 1935: Pl. IXa:602, and von Wickede 1990: Pl. 408. Cf. also here Pl. IV:3. Cat. no. 1.

6. Frag. jar sealing (4.3 x 2.3 x 1.3 cm). Baked clay. Reverse shows string marks. Impression of an oval seal (c. 2.2 x 1.8 cm) depicting two horned goats *tête-bêche*. Arpachiyah, A 610. Trench G, 1.7 m below surface in 'loose black soil'. London, I.A.U.L. Reg. no. 53/469. Cf. Mallowan/Rose 1935: Pl. IXa:610, and von Wickede 1990: Pl. 404. Cf. also here Pl. IV:11. Cat. no. 10.

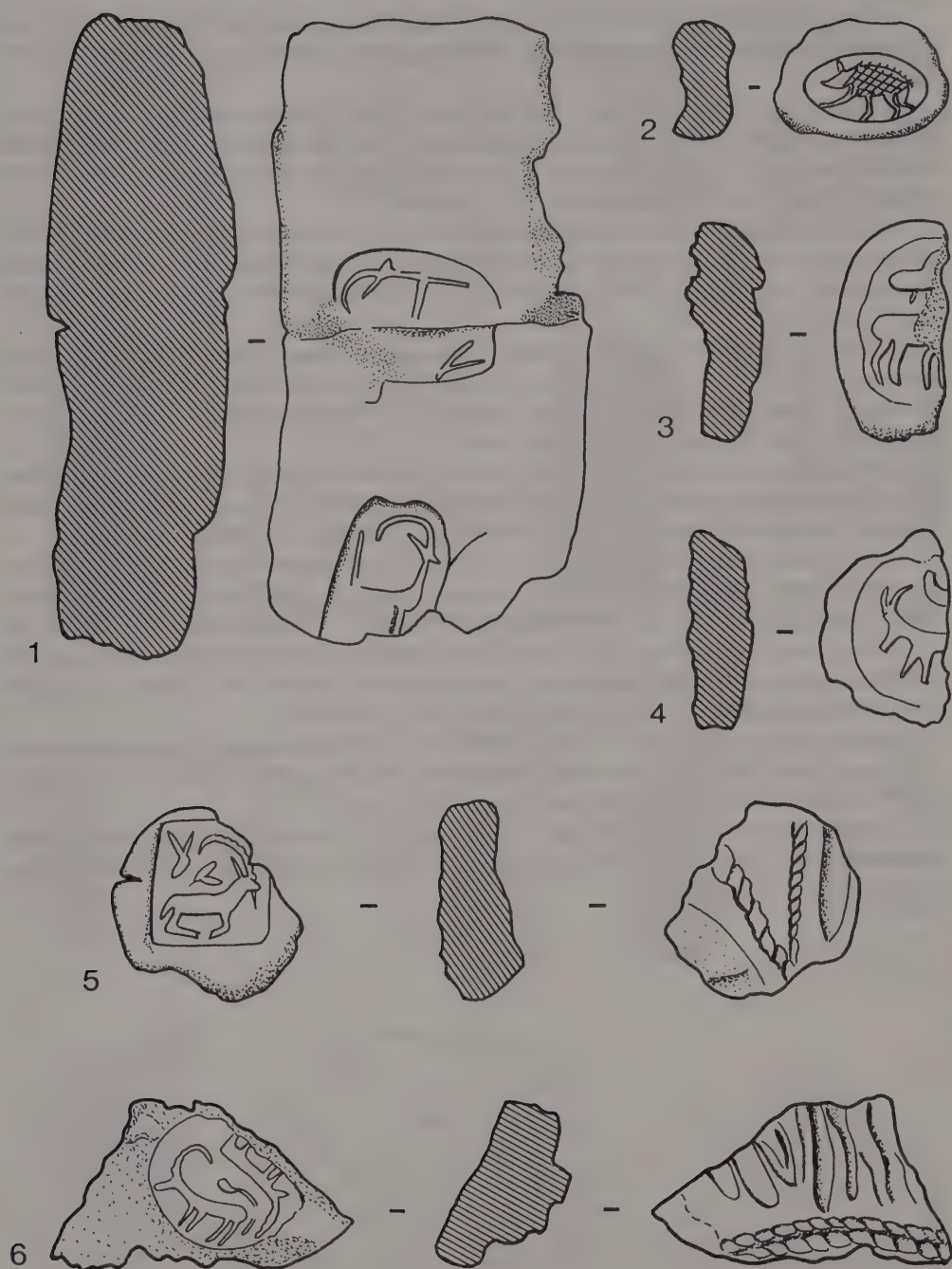


Fig. 4. Seal impressions from Arpachiyah. Early Uruk-Gawra period. Scale 1: 1

Fig. 5.

1. Frag. clay sealing (2.5 x 2.0 x 1.4 cm). Baked brown to dark greyish-black clay. Seal impression with linear design. Arpachiyah. No field number. London, I.A.U.L. Reg. no. 53/1324. Cat. no. 63.

2. Frag. clay sealing (l. 2.5 cm; w. 2.2 cm); slightly baked. Impression of round stamp seal. The design consists of twig-like motifs surrounded by two curved lines. Arpachiyah. No field number. Trench A, 1.4 m below surface, 'in lower ash'. London, I.A.U.L. Reg. no. 53/445 Cf. von Wickede 1990: Pl. 411. Cf. also here Pl. IV:5. Cat. no. 64.

3. Frag. jar sealing (2.5 x 2.4 x 1.4 cm). Slightly baked clay. String marks on reverse. The seal impression shows probably two quadrupeds and snake-like motif. Arpachiyah. No field number. T.T. surface. London, I.A.U.L. Reg. no. 53/492. Cf. von Wickede 1990: Pl. 409. Cf. also here Pl. IV:4. Cat. no. 65.

4. Frag. clay sealing (4.3 x 3.2 x 1.6 cm); probably a jar sealing. Impression of a rectangular stamp seal (ht. 2.9; ext. w. 2.5 cm). The seal design consists presumably of two animals, placed *tête-bêche*. Arpachiyah. No field number. Trench C-D, 1.0 m below surface? London, I.A.U.L. Reg. no. 53/1324. Cf. here Pl. IV:12. Cat. no. 66.

5. Frag. baked clay sealing (4.2 x 3.1 x 1.7 cm). Sealing of a basket? Impression of a round seal with ornamental design consisting of a star-like motif in the centre surrounded by a band of lozenges. Arpachiyah. No field number. London, I.A.U.L. Reg. no. 53/1324. Cat. no. 67.

6. Frag. clay sealing, perhaps a tag (2.7 x 2.5 x 0.7 cm). Impression of a round stamp seal depicting a snake. Arpachiyah. No field number. Trench G, 2.0 m below surface? London, I.A.U.L. Reg. no. 53/1324. Cf. von Wickede 1990: Pl. 413. Cf. also here Pl. IV:6. Cat. no. 68.

7. Frag. baked clay sealing (3.3 x 2.0 x 1.2 cm); probably a basket sealing. Impression of a round seal with a snake motif. Arpachiyah. No field number. London, I.A.U.L. Reg. no. 53/1324. Cf. von Wickede 1990: Pl. 410. Cf. also here Pl. IV:7. Cat. no. 69.

8. Frag. jar sealing (5.0 x 3.3 x 2.0 cm). Baked clay. Two impressions of a square stamp seal (c. 1.3 x 1.2 cm). Seal design uncertain. Arpachiyah. No field number. Level TT 2. London, I.A.U.L. Reg. no. 53/1324. Cf. also here Pl. IV:13. Cat. no. 70.

9. Frag. clay sealing (3.5 x 2.8 cm). Impression of a Ninevite 5-style cylinder seal with ornamental design. Arpachiyah. No field number. London, I.A.U.L. Reg. no. 53/1324. Cf. also here Pl. IV:14. Cat. no. 71.

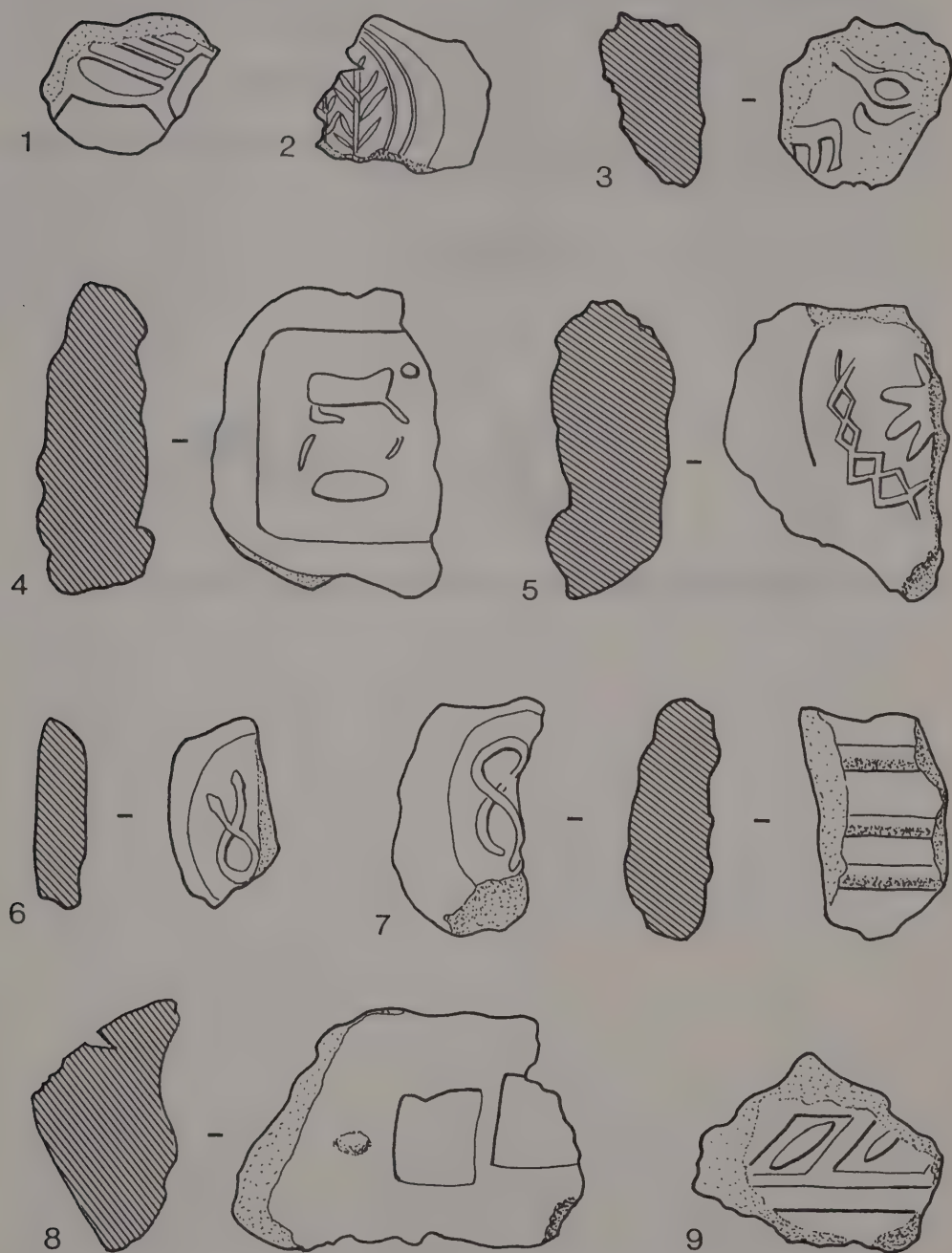


Fig. 5. Seal impressions from Arpachiyah. Early Uruk-Gawra and Ninevite 5 period. Scale 1: 1

Fig. 6.

1. Seal impression. Tepe Gawra, stratum X (?). G 3-495 a-d and G 6-210 a-c. Philadelphia, U.M. 35-10-18 a-d and 37-16-15, 16. Cf. Tobler 1950: Pl. CLXVIII:149, 150, and von Wickede 1990: fig. 35:1. Cf. also here Pl. V:2.

2. Seal impression. Tepe Gawra, stratum X (?). G 3-481. Philadelphia, U.M. 35-10-20. Cf. Tobler 1950: Pl. CLXX:178, and von Wickede 1990: fig. 35:2.

3. Seal impression. Tepe Gawra, stratum X (?). G3-434. Baghdad, I.M. 26897. Cf. Tobler 1950: Pl. CLXVII:137, and von Wickede 1990: fig. 35:3.



Fig. 6. Seal impressions from Tepe Gawra. Early Uruk-Gawra period. Scale 1: 1

Plates

Plate I.

1a-b. Ovoid clay bulla (l. 6.4 cm; d. 2.9-3.1 cm) with 18 impressions of a hand-shaped seal-pendant (c. 1.4 x 1.2 cm); linear design with star-like motif in the centre. Arpachiyah, A 619. Level TT 6, burnt house. London, B.M. 127695. Cf. Mallowan/Rose 1935: Pl. IXb (top row, 1st from left), and von Wickede 1990: Pl. 54a-b. Cat. no. 31.

2a-b. Ovoid clay bulla (l. 5.7 cm; d. 2.6-2.9 cm) with 10 impressions of a hand-shaped seal-pendant (c. 1.4 x 1.2 cm); linear design with star-like motif in the centre. Arpachiyah, A 619. Level TT 6, burnt house. London, B.M. 127701. Cf. Mallowan/Rose 1935: Pl. IXb (top row, 2nd from left), and von Wickede 1990: Pl. 55a-b. Cat. no. 32.

3a-b. Ovoid clay bulla (l. 5.2 cm; d. 2.2-2.6 cm) with 8 impressions of a hand-shaped seal-pendant (c. 1.4 x 1.2 cm); linear design with star-like motif in the centre. Arpachiyah, A 619. Level TT 6, burnt house. London, B.M. 127696. Cf. Mallowan/Rose 1935: Pl. IXb (top row, 3rd from right), and von Wickede 1990: Pl. 56a-b. Cat. no. 33.

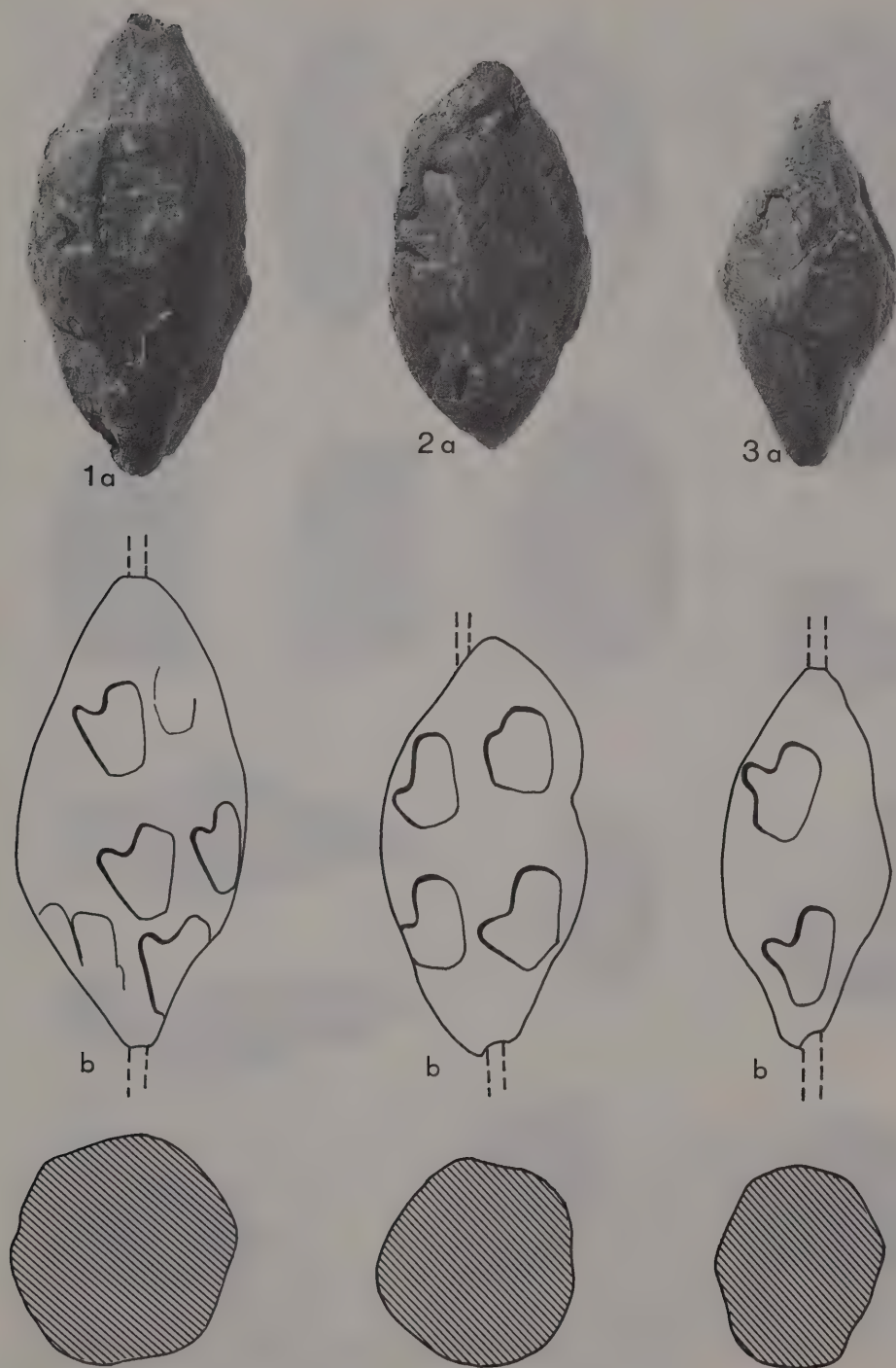


Plate I. Seal impressions from Arpachiyah. Halaf period. Scale 1:1

Plate II.

- | | |
|-------|----------------|
| 1a-c. | See Fig. 2:4. |
| 2a-b. | See Fig. 2:6. |
| 3a-c. | See Fig. 2:7. |
| 4. | See Fig. 2:8. |
| 5a-b. | See Fig. 1:3. |
| 6. | See Fig. 2:1. |
| 7. | See Fig. 2:3. |
| 8. | See Fig. 2:2. |
| 9. | See Fig. 2:10. |
| 10. | See Fig. 2:11. |

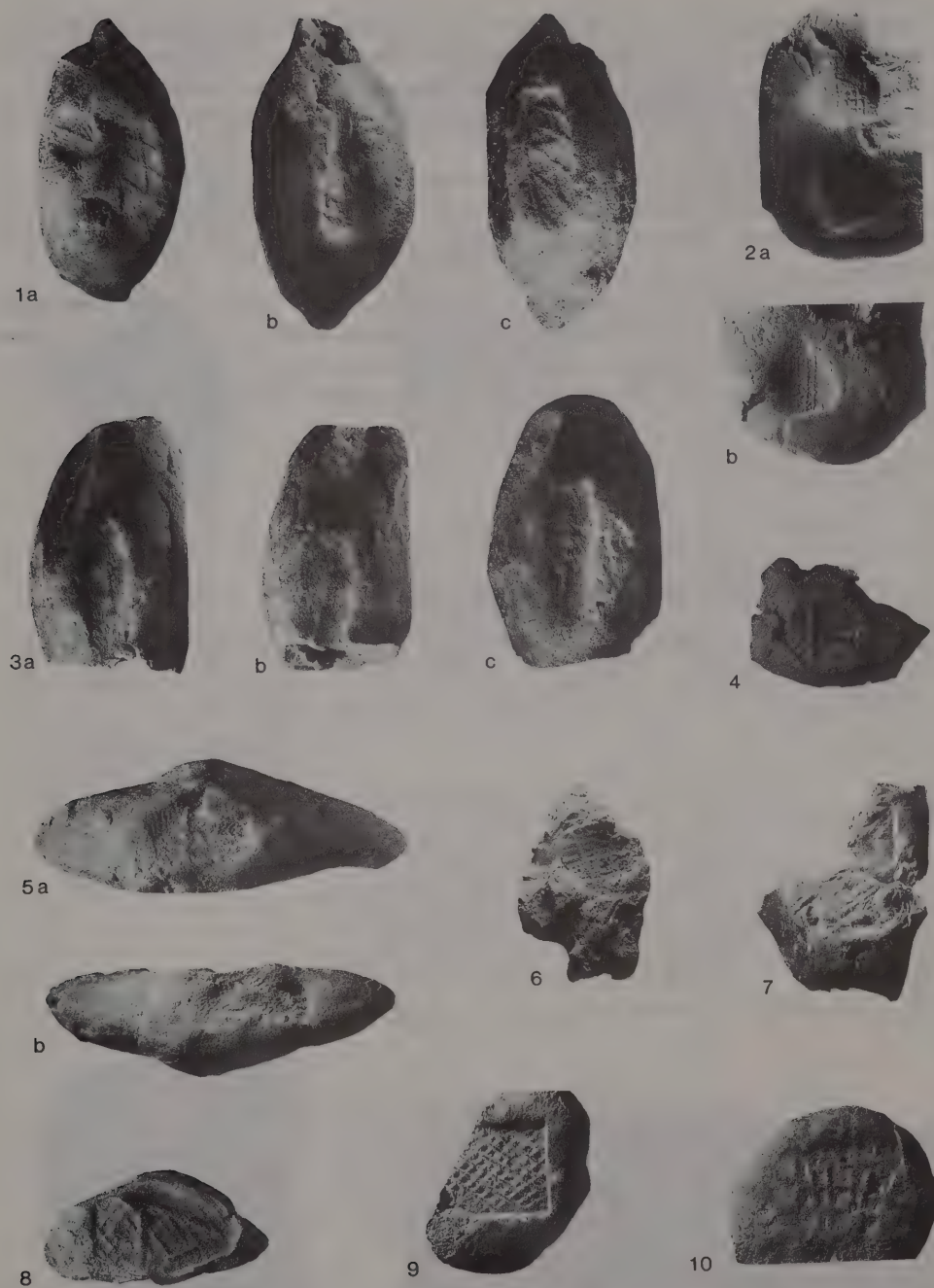


Plate II. Seal impressions from Arpachiyah. Halaf period. Scale 1:1

Plate III.

1a-b. Frag. sealing (4.0 x 3.7 x 1.4 cm); probably from tongue-shaped clay strip. Baked chaff-tempered clay. No string marks on reverse. One impression of square stamp seal (2.5 x 2.4 cm). The impression shows a horned goat in the centre, surrounded by filling motifs. Arpachiyah, A 606 Trench G, surface. London, B.M. 127700. Cf. Mallowan/Rose 1935: Pl. IXa: 606, and von Wickede 1990: Pl. 415a-b. Cat. no. 6.

2a-b. Frag. sealing (3.0 x 2.3 x 1.3 cm). Baked black clay. Impression of a rectangular stamp seal depicting a saluki-dog following a young animal. Arpachiyah, A 612. Trench D, 0.5 m below surface. London, B.M. 127702. Cf. Mallowan/Rose 1935: Pl. IXa: 612, and von Wickede 1990: Pl. 417a-b. Cat. no. 12.

3a-b. Frag. tongue-shaped clay strip (ext. l. 7.6 cm; w. 3.3 cm; th. 1.6 cm). Highly burnt chaff-tempered clay. No string marks on reverse. Three impressions of circular stamp seal (d. 1.8 cm) depicting a vulture above the back of a kid. Arpachiyah, A 604. Level TT 4, well. London, B.M. 127699. Cf. Mallowan/Rose 1935: Pl. IXa: 604, and von Wickede 1990: Pl. 418a-b. Cat. no. 4.

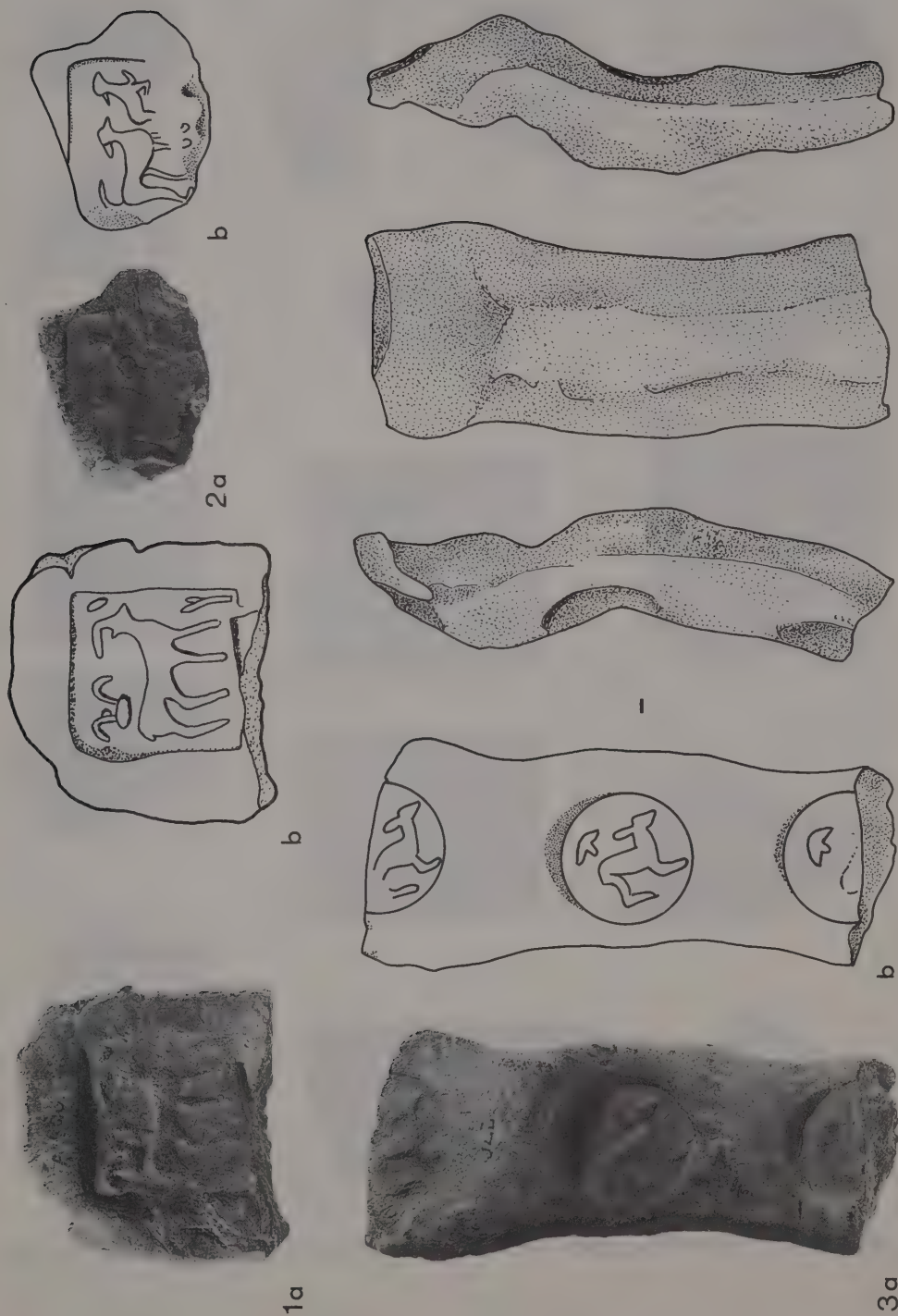


Plate III. Seal impressions from Arpachiyah. Early Uruk-Gawra period. Scale 1:1

Plate IV.

1. See Fig. 4:2.
2. See Fig. 4:3.
3. See Fig. 4:5.
4. See Fig. 5:3.
5. See Fig. 5:2.
6. See Fig. 5:6.
7. See Fig. 5:7.
- 8a-b. See Fig. 3:2.
- 9a-b. See Fig. 3:3.
10. See Fig. 4:1.
11. See Fig. 4:6.
12. See Fig. 5:4.
13. See Fig. 5:8.
14. See Fig. 5:9.

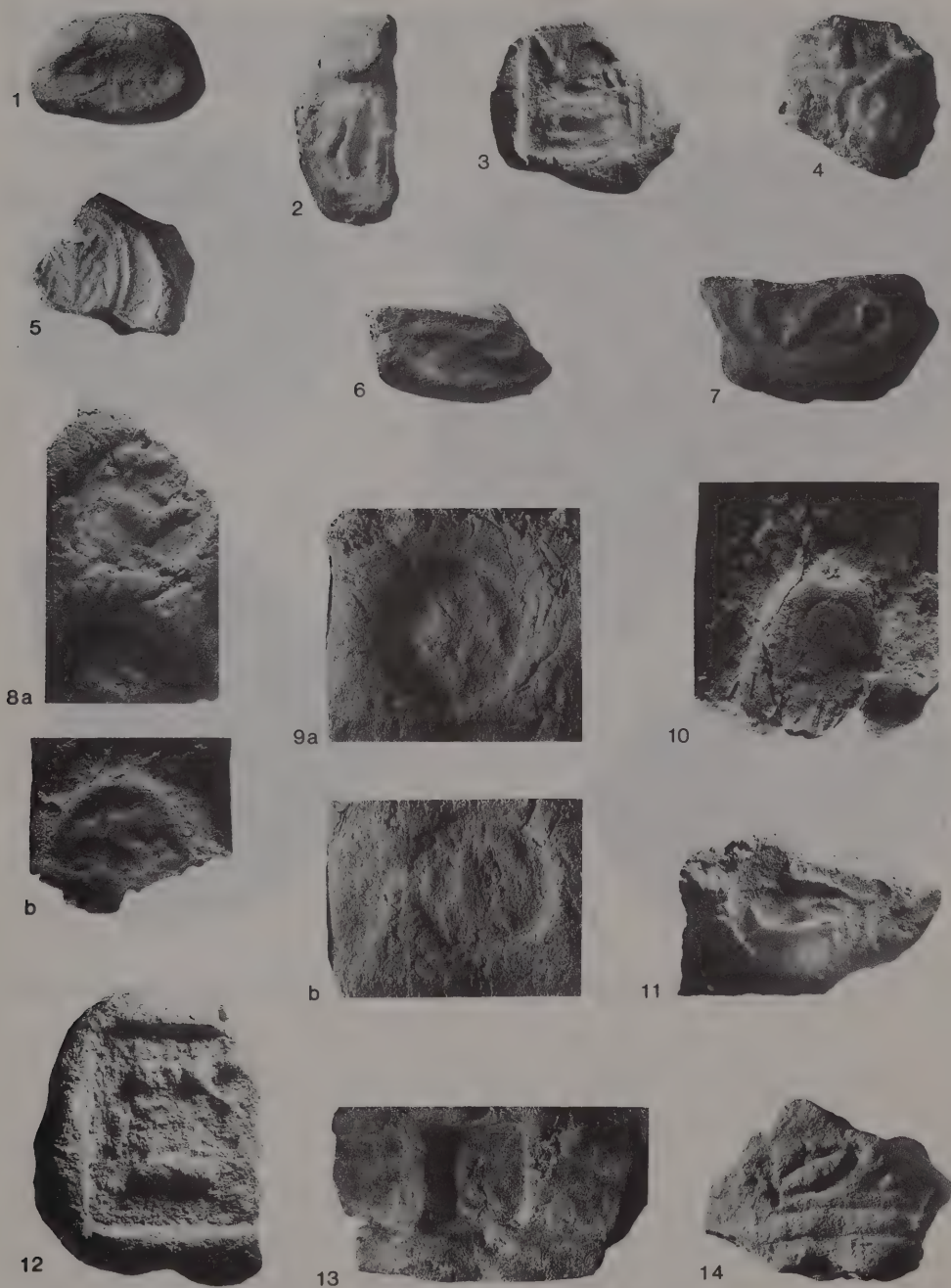


Plate IV. Seal impressions from Arpachiyah. Early Uruk-Gawra and Ninevite 5 periods. Scale 1:1

Plate V.

1. Seal impression. Tepe Gawra, stratum XIA (?). G 6-266. Philadelphia, U.M. 37-16-88. Cf. Tobler 1950: Pl. CLXX:174.
2. Seal impressions. Tepe Gawra, stratum X (?). G 6-210. Philadelphia, U.M. 37-16-15. Cf. Fig. 6:1.
3. Seal impressions. Tepe Gawra, stratum XII (?). G6-250. Philadelphia, U.M. 37-16-211. Cf. Buchanan 1967: p. 277 fig. 3.
4. Seal impression. Tepe Gawra, stratum 'XA' (XIA). G 6-182. Philadelphia, U.M. 37-16-30. Cf. Tobler 1950: Pl. CLXIX:161, and von Wickede 1990: Pls. 271; 276.

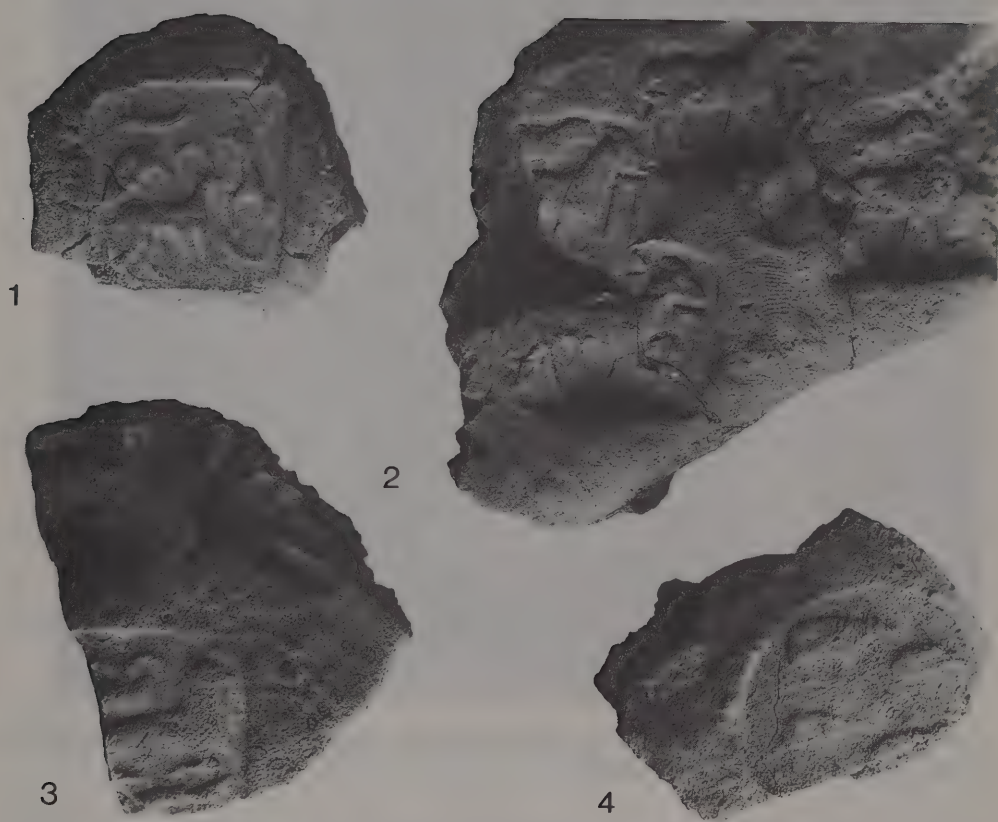


Plate V. Seal impressions from Tepe Gawra. Early Uruk-Gawra period. Scale 6:5

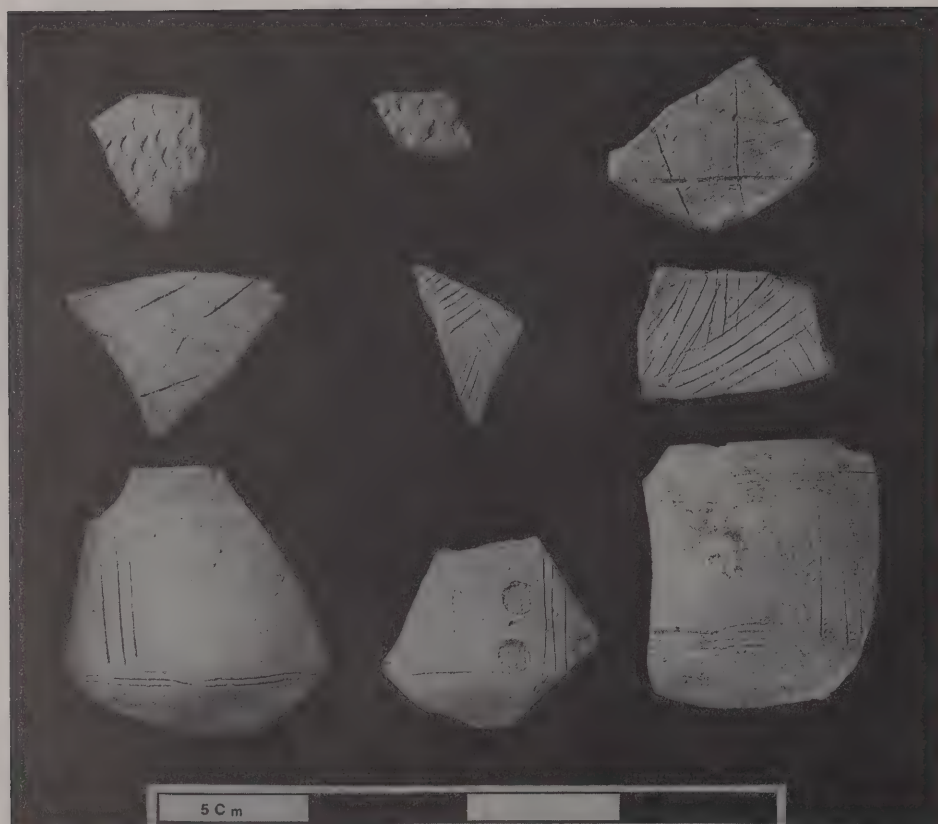


Plate VI. Impressed and incised pottery from Arpachiyah. Early Uruk-Gawra period. Collection of the Institute of Archaeology, London.

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BOOKS RECEIVED

1990-1991

Editor's Note

The Bulletin has long maintained its role as a reviewing journal in those many areas in which the Institute has been active. However, in recent years the number and range of publications relating to archaeology has greatly increased and the cost of producing the review section of the Bulletin has risen sharply. We have therefore decided that, as from this issue, we should adopt a more selective reviewing policy. In future, priority will be given to invited or volunteer review articles which will examine a major topic or matter of debate. At the same time, all books received by the Institute Library for review will be listed with cataloguing details. We should like to express our continuing gratitude to the many publishers and other bodies who have regularly sent new publications to the Institute Library and we hope that this will continue in the years to come, so that it may maintain its status as a resource of national importance.

Books received for Review since 1st August 1990

BETTS, A.V.G. (ed.) *Excavations at Jawa 1972-1986: stratigraphy, pottery and other finds*. Edinburgh: Edinburgh U.P., 1991. £35.00. ISBN 0-7486-0307-7

BLACK, J and GREEN, A. *Gods, demons and symbols of ancient Mesopotamia: an illustrated dictionary*. London: British Museum Press, 1992. £12.95. ISBN 0-7141-1705-6

BOMANN, A.H. *The private chapel in ancient Egypt: a study of the chapels in the workmen's village at el Amarna with special reference to Deir el Medina and other sites*. London: Kegan Paul International, 1991. £55.00. ISBN 0-7103-0346-7

BOWDEN, M. *Pitt Rivers: the life and archaeological work of Lieutenant-General Augustus Henry Lane Fox Pitt Rivers, DCL, FRS, FSA*. Cambridge: Cambridge U.P., 1991. £24.95. ISBN 0-521-40077-5

BROSHI, M. (ed.) *The Damascus document reconsidered*. Jerusalem: Israel Exploration Society, 1992. No price indicated. ISBN 965-221-014-5

BUDGE, E.A. Wallis. *A hieroglyphic vocabulary to the Book of the Dead*. New York: Dover Publications, Inc., 1991. £8.95. ISBN 0-486-26724-5. (Reprint of the 1911 edition.)

BURNOUF, J. et al. *Le Pont de la Guillotière: franchir le Rhône à Lyon*. Lyon: Circonscription

des Antiquités Historiques, 1991. (Documents d'Archéologie en Rhône-Alpes, no. 5). FF 160.00
ISBN 2-90619009-8 ISSN 0989-6058

CASTLEDEN, R. *Neolithic Britain: new stone age sites of England, Scotland and Wales.* London
Routledge, 1992. £45.00. ISBN 0-415-05845-7

CHEVALLIER, R. *L'artiste, le collectionneur et le faussaire: pour une sociologie de l'art
romain.* Paris: Armand Colin, 1991. no price indicated. ISBN 2-20037252-3

CRAMP, R. *Grammar of Anglo-Saxon ornament: a general introduction to the Corpus of Anglo-
Saxon stone sculpture.* Oxford: Oxford U.P./British Academy, 1991. £7.50. ISBN 0-19-726098-5

CUNLIFFE, B. *Iron Age communities in Britain: an account of England, Scotland and Wales
from the seventh century BC until the Roman conquest.* (3rd ed.) London: Routledge, 1991.
£75.00. ISBN 0-415-05416-8

DUMARCAY, J. *Borobodur.* (2nd ed.) Oxford: Oxford U.P., 1992. £8.95. ISBN 0-19-588550-3

EARLE, T. (ed.) *Chieftdoms: power, economy and ideology.* Cambridge: Cambridge U.P., 1991.
(School of American Research advanced seminar series). £40.00. ISBN 0-521-40190-9

FEHRING, G.P. *The archaeology of medieval Germany: an introduction.* London: Routledge,
1992. (Studies in archaeology). £35.00. ISBN 0-415-04062-0

FONTAINE, P. *Cités et enceintes de l'Ombrie antique.* Bruxelles: Institut Historique Belge de
Rome, 1990. (Etudes de philologie, d'archéologie et d'histoire anciennes; 27). BF 2900. ISSN
0071-1926

GREENE, K. *Roman Pottery.* London: British Museum Press, 1992. (Interpreting the past).
£4.95. ISBN 0-7141-2081-2

GUNN, S.J. and LINDLEY, P.G., (eds) *Cardinal Wolsey: church, state and art.* Cambridge:
Cambridge U.P., 1991. £35.00. ISBN 0-521-37568-1

HIGHAM, N. *Rome, Britain and the Anglo-Saxons.* London: Seaby, 1992. £18.50. ISBN
1-85264-022-7

HOADLEY, M. *Roman herbal: herbs used in Roman Britain for cooking and medicines.*
Newcastle-upon-Tyne: Frank Graham, 1991. £2.25. ISBN 0-8598123-X

HODDER, I. *Archaeological theory in Europe: the last three decades.* London: Routledge, 1991.
(Material cultures). £35.00. ISBN 0-415-06521-6

KEMPINSKI, A. and REICH, R. (eds) *The architecture of ancient Israel, from the prehistoric*

to the Persian periods. Jerusalem: Israel Exploration Society, 1992. \$48 + \$8 postage. ISBN 965-221-013-7

KENYON, J.R. *Medieval fortifications*, Leicester: Leicester U.P., 1990. (Archaeology of Medieval Britain). £14.95. ISBN 0-7185-1392-4

KNAPP, A.B. (ed.) *Archaeology, Annales and ethnohistory*. Cambridge: Cambridge U.P., 1992. (New directions in archaeology). £32.50. ISBN 0-521-41174-2

LAYTON, R. *The anthropology of art*. (2nd ed.) Cambridge: Cambridge U.P., 1991. £32.50 (hb); £11.95 (pb). ISBN 0-521-36367-5; 0-521-36894-4

LONGACRE, W.A. (ed.) *Ceramic ethnoarchaeology*. Tucson: University of Arizona Press, 1991. \$50.00. 0-8165-1198-5

MOOREY, P.R.S. *A century of Biblical archaeology*. Cambridge: Lutterworth Press, 1991. £9.95. ISBN 0-7188-2825-9

MUSEUMS AND GALLERIES COMMISSION. CONSERVATION UNIT. *Science for Conservators. Vol. I, Introduction to materials; Vol. II, Cleaning; Vol. III, Adhesives and Coatings*. London: Routledge, 1992. (Conservation for science teaching series). £30.00 per volume (hb); £11.99 per volume (pb). 0-415-07166-6 (hb), 0-415-07167-4 (pb); 0-415-07164-X (hb), 0-415-07165-8 (pb); 0-415-07162-3 (hb), 0-415-07163-1 (pb).

OGDEN, J. *Ancient jewellery*. London: British Museum Press, 1992. (Interpreting the past). £4.95. ISBN 0-7141-2060-X

OSSEL, P. van. *Etablissements ruraux de l'Antiquité tardive dans le nord de la Gaule*. Paris: Editions du Centre National de la Recherche Scientifique, 1991. (51e Supplément à Gallia.) FF 450.00. ISBN 2-22204601-7

PERRING, D. and ROSKAMS, S. *The archaeology of Roman London. Vol. 2, Early development of Roman London west of the Walbrook*. London: Council for British Archaeology, 1991. (CBA research report; 70). £32.00 ISBN 0-906780-92-6; ISSN 0589-4036

POSTGATE, J.N. *Early Mesopotamia: society and economy at the dawn of history*. London: Routledge, 1992. £60.00. ISBN 0-415-00843-3

RATNAGAR, S. *Enquiries into the political organization of Harappan society*. Pune: Ravish Publishers, 1991. Rs 600. No ISBN

REILLY, P. and RAHTZ, S. (eds) *Archaeology and the information age: a global perspective*. London: Routledge, 1992. (One world archaeology; 21). £50.00. 0-415-07858-X

RIDLEY, R.T. *The eagle and the spade: archaeology in Rome during the Napoleonic era*. Cambridge: Cambridge U.P., 1992. £50.00. ISBN 0-521-40191-7

ROGERS, G.M. *The sacred identity of Ephesos: foundation myths of a Roman city*. London: Routledge, 1991. £30.00. ISBN 0-415-05530-X

RUSSELL, J.M. *Sennacherib's palace without rival at Nineveh*. Chicago: University of Chicago Press, 1991. \$45.00. ISBN 0-226-73175-8

SCHIFFER, M.B. (ed.) *Archaeological method and theory. Vol. 4*. Tucson: University of Arizona Press, 1992. \$40.00. ISSN 1043-1691

SHANKS, M. *Experiencing the past: on the character of archaeology*. London: Routledge, 1991. £35.00. 0-4154-05584-9

SPIELMANN, K.A. (ed.). *Farmers, hunters and colonists: interaction between the Southwest and the southern plains*. Tucson: University of Arizona press, 1991. £35.00. ISBN 0-8165-1224-8

WELCH, M.G. *English heritage book of Anglo-Saxon England*. London: Batsford, 1992. £25.00 (hb); £14.99 (pb). 0-7134-6565-4 (hb); 0-713465662 (pb).

WILKES, J.J. *The Illyrians*. Oxford: Blackwell, 1992. (The Peoples of Europe). £30.00. ISBN 0-631-14671-7

BOOK REVIEWS

GIBSON, Alex and WOODS, Ann. *Prehistoric Pottery for the Archaeologist*. 276pp, 239 figs. Leicester University Press, 1990. ISBN 0-7185-1274-X Hbk. £60.00

It is useful to have the aims of a book explicitly stated: this one is described as a 'handbook and source of reference for further study' for 'undergraduates, continuing education students and colleagues in local archaeological units'. It is 'not intended for the specialist'. It will be assessed on these terms: I shall write as someone who works frequently with Roman and medieval pottery, but occasionally has prehistoric pottery thrust upon him.

The book divides into two parts; three short essays on The Study of Pottery, the Technology of Prehistoric Pottery and Chronological Sequence of British Prehistory Pottery are followed by a much longer Glossary (about 1/3 of the whole book) and a Bibliography. The two parts are linked by the device of highlighting in the essays the occurrences of terms explained in the Glossary.

The three essays are useful scene-setting introductions to three complex topics. The title of the first is slightly misleading—History of the Study of British Prehistoric Pottery would be more accurate. The emphasis given to beaker pottery and its tortuous typologies is surprising; perhaps this is a sort of aversion therapy to prepare the reader for the technological approach of the next chapter. This chapter, in particular, seeks to dispel the many myths and misunderstandings that surround prehistoric pottery and its manufacture. As a non-specialist I cannot vouch for the accuracy of the account given in Chapter 3 but as it is heavily referenced, the sources of information can easily be checked. These chapters should be used

as the authors intend: simply as a way into the literature of their topics.

I am less happy with the Glossary, which is the heart of the book. Here some 300 terms, technical, descriptive and attributive, are arranged in strict alphabetical order with a (usually) short account and often an illustration. Thus we have an alliterative jumble – e.g. Bloating, Boghead bowls, Body, Breedon-Ancaster group – with much cross-referencing to related terms and synonyms. While this works as a way of simplifying the essays and making them more readable, I think it fails in its main 'handbook' role. This is because, in order to look something up, one needs to know what it is that one is looking up, and in the state of ignorance of the presumed readership, one probably doesn't. Separate glossaries of technical and descriptive terms could be useful (because one is usually referred to them from elsewhere), but the attributive terms, (wares, styles etc.) need a more imaginative approach. To look at an analogy, Peacock's scheme for identifying inclusions was such a success because it did not list and describe inclusion types. Instead, it provided a step-by-step key which gradually narrowed the field until the user arrived at (one hopes) the correct identification. A similar approach would be far more useful to the archaeologist trying to make sense of the prehistoric pottery, say, from a mainly Roman site. Even if (s)he intends to pass the buck to a specialist, a basic identification is needed to ascertain which specialist. Clearly this would have been more work for the authors, but could have established a new standard in period pottery handbooks. The mention of periods raises the question of why the authors chose to make a series of forays into Roman pottery and even one into Medieval

(under the heading Glaze, which is surely irrelevant to prehistory).

Finally, the Bibliography appears to be extremely useful as a consolidated reading list, but might it not have been enhanced by being broken down into topics, period or otherwise?

I feel that the publishers have not served the authors well in their attempt to meet the stated aims. By far the biggest 'own goal' is the price – at £60.00 this book is beyond the reach of all the intended audience except possibly the most well-heeled evening class student. Perhaps a paper-back is planned, but I expect that most potential purchasers will just sit back and wait for the hardback to be remaindered (assuming they are law-abiding and do not resort to the photocopier). Other sources of irritation are the surprising typos (whole lines are either omitted or repeated) and discrepancies between references in the text and their bibliographic entries, which one would not expect in a book of this price. For me, the corresponding volumes in the *Shire Archaeology* series (Sheila Elsdon's *Later Prehistory Pottery in England and Wales*, 1989 and Alex Gibson's own *Neolithic and Early Bronze Age Pottery*, 1986) represent better value for money.

ARNOLD, Philip J., *Domestic ceramic production and spatial organization*. New Studies in Archaeology, 163pp, 29 figs, Cambridge University Press, 1991. ISBN 0-521-391997 Hbk. £37.50

Three points must be clarified before we start to look at this book: firstly, it is not by Dean Arnold, well known to ceramicists, but Philip Arnold III; secondly, it is subtitled 'A Mexican case study in ethnoarchaeology'; and thirdly, it is clearly a tidied-up PhD thesis. For once this actually makes it easier to read, as each chapter is carefully introduced and summarised.

The book falls into two distinct halves; the first, the 'Mexican case study', is an account of domestic (part-time) potting activity in four villages of the Tuxtlas region of southern Mexico. It is firmly in the 'ceramic ecology'

tradition, so we are told how the potters obtain their raw materials (clay, temper and fuel), prepare them, form their pots, dry and fire them. To complete the picture, domestic ceramic inventories are described and the life-spans of the various types of pot are estimated. So far, it is a mildly interesting but far from exciting description of the type which has become popular since Foster's work in the 1950s and which can be traced back to Guthe in the 1920s and probably even earlier.

What makes this book different is the second part, in which the author picks up the main 'loose end' left over from the first – why do all the potters at one village (San Isidro) fire their pots in small permanent kilns, while the potters at the other three villages use open 'bonfire' firing? The conventional study of the first part of the book reveals no differences in potting practice (methods, intensity, scale of production) which would account for this difference. The author shows, quite convincingly, that this is due to differences in the domestic space around the potters' homes, which is only about half the area at San Isidro that it is at the other three villages. Thus, while the other villages control their firing conditions by choosing the location for their bonfire to suit prevailing wind and weather, the San Isidro potters achieve control by enclosing their firing in a fixed kiln. The author seeks confirmation for this symptom of spatial stress, and finds it in the very different patterns of waste disposal at the two groups of villages.

The next task is to relate all this to archaeology. The author wisely avoids the use of direct analogy, and picks up the question of 'modes' of production, probably best known to British ceramicists through the work of Peacock (1982). Since doubt has already been cast on the often used diagnostic element – the presence of fixed kilns – he raises the wider question of how we can identify modes of production, or indeed production sites at all, in the archaeological record. Conventional diagnosis is found to be often at fault, but once again a study of the use of space, taking into account the various stages that comprise

pottery manufacture, and the way in which they impinge on each other and on domestic activity, shows a way forward. A final short case-study, re-assessing published work at Comoapan, Mexico, demonstrates the utility of the approach.

This is a valuable book which should broaden the approach of archaeologists seeking to understand ceramic production sites. Depending on their theoretical position, some may find the bowing and scraping towards Binford and other gurus and the claims that the book is making 'middle-range theory', unnecessary ritual activity.

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PERRING, Dominic and ROSKAMS, Steve with **ALLEN, Patrick.** *The Archaeology of Roman London, Vol. 2: Early Development of Roman London west of the Walbrook.* CBA Research Report 70, 1991, ISBN 0-906780-92-6 126pp, 93 figs, 8 colour plates. Pbk. .£32.

The Museum of London's Department of Urban Archaeology was abolished on December 2nd 1991, precisely 18 years after it had been established to rescue the fast-disappearing evidence of the City's origins. In its last years, the Department's teams were expected to record sites at speed to a uniformly high standard, but under site conditions that were often far from ideal. The excavators were obliged to share their sites with the deafening noise and illegally dangerous working practices of construction teams hell-bent on building short-life office blocks as cheaply as possible. The volume under review reports on the work on an earlier generation of sites, most of which were excavated in the 1970s under what would now be considered a leisurely pace. This was the time when the Department's field archaeologists were developing the detailed methodology needed to dissect the remains of the brickearth buildings which formed such a prominent part

of the Roman townscape. Indeed, it could be argued that the importance of the work considered in this review lies as much in the contribution to London's archaeological methodology as in the actual results obtained.

The first half of the report presents summaries of five sites excavated between 1975 and 1980, at Newgate Street, Watling Court, Well Court, Ironmonger Lane and Milk Street, and incorporates a note on previous work on the latter site in 1972. All these sites produced clear evidence of brickearth-wall buildings of a variety of types, which had been built between c.AD 50 and c.AD 180. The development of each site is considered individually, phase by phase, with illustrations at comparable scales. Substantial sequences of buildings were recorded in detail, together with evidence of associated roads and yards. Reports on the building material are also published.

The results are then brought together in two extended discussions, the first on the variety and chronology of the brickearth building techniques represented (for which a selection of material from the eastern half of the settlement is included), in which the evidence for workshops and lower-class housing is compared and contrasted with better-quality residential buildings. This section is by Dominic Perring (a former Institute student) and represents the most detailed assessment of the vernacular architecture of Londinium yet published. There is little here that has not been overtaken by more recent research, although the assertion that a timber stud found at Pudding Lane represents 'the strongest evidence yet for the use of full box framing construction techniques' in Roman London (p. 73) has now been qualified by the work of another former Institute student: those interested should consult Damian Goodburn's important assessment of timbers excavated at the Cannon Street Station site (see for example, *Rescue News* no. 50, 1990).

The next section considers the topographical development of the western half of Londinium before AD 200, using evidence from the principal sites described, and from 49 others. However, sites from the south-west of

the settlement and within the area of the Cripplegate Fort are excluded, as is, more understandably, material from the recent excavations. This narrow selection might call into question the wider validity of any of the inferences drawn as to the general nature of the development of Londinium as a whole, but the discussion is nonetheless a valuable statement on the planning and growth of the settlement. The section on the so-called 'dark-earth', the grey sandy silt horizon that covers the uppermost surviving phase of Roman occupation on the sites, restates the suggestion that it represents material brought in and dumped over the demolished buildings. Brian Yule's more recent discussion of the problem in *Antiquity*, 1990 is not cited in the bibliography, and some of the objections he raised are not answered here: it must be stressed that although many site sequences are sealed by such an horticultural horizon, this dramatic change took place at noticeably different dates on different sites (i.e. it was not a single, universal event). Although there is clear evidence on Milk Street that the silts sealed the final occupation level, there is evidence on other sites that occupation levels had in fact been lost at the interface, as the presence of truncated pits on Newgate Street (Period X) suggests.

Although dating tables are included, there are no detailed pottery, coin or other finds reports in this volume. The authors explain that the large, well-stratified ceramic assemblages recovered from their work will be published in volume 5 of the CBA series, but no indication is given as to the fate of any faunal remains or small finds which one might reasonably expect to have been recovered: surprisingly, such classes of data have not been used to assist in the evaluation and interpretation of the sites.

The report is produced in the familiar double-column format of the CBA series, and to their usual high standard. There are some welcome colour plates, essential for reports such as this which deal with subjects like brickearth buildings, the details and textures of which are all but lost in monochrome. Among the few errors noted, it may be worth pointing out that the bibliographic entry for Shepherd (forth-

coming) actually refers to an important report published in LAMAS 1987 (by yet another former Institute student) which concerns King (not Long) Street.

The volume is the second in the CBA's *Archaeology of Roman London* series, but it should be stressed that this series is not as definitive as it has been deceptively delineated in black and magenta on the back cover. For confusing reasons of its own, the Museum also publishes major reports of Roman excavations in many other outlets not in this particular series, utilising the *Transactions of the London & Middlesex Archaeological Society*, the associated Special Paper series, *Britannia*, and also the reports published by HMSO. *The Development of Roman London west of the Walbrook* is not the 2nd but the 20th major report on excavations of Roman sites in the City published since 1974. Nevertheless, this volume is to be warmly welcomed, providing as it does a thorough assessment of a class of building which formed by far the most common component of the early Roman town.

If the Museum of London took 11 years to publish these 5 excavations at a time when it had a large staff and full funding from the DoE (latterly HBMC) to support its post-excavation programme, how long will it take to publish the 400 excavated sites since 1980, now that it has fewer staff, and no assured publication funding from HBMC? The Museum now has a substantially larger backlog of unpublished sites in 1992 (following its abolition of the DUA) than it had on December 3rd 1973. The report reviewed here shows something of the potential of the material that will languish in the archives for the next half century or more. HBMC seems reluctant to take responsibility for the material from the later generation of sites since those excavations were funded by the site developers: researchers of the Institute should take note, for there is primary material there to launch a thousand PhDs.

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Notes to Contributors

Papers on any aspect of archaeology may be considered for publication in the *Bulletin*. All contributions and related correspondence should be addressed to the Editor, Professor J.J. Wilkes, Institute of Archaeology, 31–34 Gordon Square, London WC1H 0PY. The following notes are provided as a guide to intending contributors in the preparation of their material.

1) *Typescripts* should not normally exceed 10,000 words in length. They should be typed on one side only of A4 size paper (approx. 30 cm by 21 cm), using double spacing and leaving wide margins (at least 4 cm on the left). Two copies of the typescript should be submitted, the author retaining a third copy (complete with duplicate figures, plates and tables). If possible, authors are asked to provide, in addition, a copy of the text on disk (preferably in Microsoft Word for Macintosh or ASCII files).

2) *Footnotes* should be avoided as far as possible. If any are judged to be absolutely necessary, they should be typed on a separate sheet, not at the foot of the page to which they refer.

3) *Bibliographical references* should follow the so-called Harvard system. The author's last name, date of publication and the significant page number should be given in brackets in the body of the text, e.g. (Sharma, 1973: 29), or, if the author's name has been cited, simply (1973: 129). Full references should be listed alphabetically according to the authors' names at the end of the paper. For example:

for a **paper**:

Sharma, G. R. 1973 Mesolithic lake cultures in the Ganga valley, India. *P.P.S.*, 39: 129–146.

for a **book**:

Butzer, K.W. 1972 *Environment and Archaeology*. London: Methuen.

for an **article in a book**:

Bordes, F. 1973 On the chronology and contemporaneity of different palaeolithic cultures in France. *The Explanation of Cultural Change: Models in Prehistory* (ed. Colin Renfrew). London: Duckworth.

Where the publication cited is a paper in a periodical the title of the journal should be italicized (or underlined) and abbreviated using, if possible, the preferred abbreviations given in the *List of Abbreviations of the Archaeological Literature* published in *Acta Praehistorica et Archaeologica*, 9/10, 1978/9, 271–383. If this is not accessible, there are various other lists

which may be consulted, e.g. the ones printed from time to time in the *American Journal of Archaeology*, the *Index des Périodiques* supplement to *l'Année Philologique*, Vol 51, 1982 (for journals dealing with Classical and Mediterranean archaeology chiefly) and the Council for British Archaeology's lists in *British Archaeological Abstracts* (for British periodicals).

4) *Line drawings, plans and maps* should be drawn in waterproof ink on smooth white paper, card or good quality tracing film. Lettering should be neatly done, either by stencilling or using self-adhesive lettering such as Letraset or Presletta, which should be varnished with the spray recommended by the makers to prevent damage. All line illustrations should be at least twice the intended final size, and of a shape suitable for reduction to a full page (17 cm x 12 cm) or half pages (8 cm x 12 cm) size. Line illustrations should be referred to as *figures* and numbered in Arabic numerals. The number should be written on the originals in soft pencil, and should correspond to bracketed references in the text, e.g. (Fig. 3).

5) *Photographs* should be printed on glossy paper and preferably be full plate or half plate size, depending on the subject and the intended final size. They should be referred to as *plates* and numbered in Roman numerals. The numbers should be written in soft pencil on the back in one corner, and correspond with bracketed references in the text, e.g. (Pl. IX).

6) *Tables* should be numbered in Arabic numerals, but separately from the line drawings.

7) *Captions* to all figures, plates, and tables should be listed on a separate sheet, and should be kept as short as is consistent with clarity.

8) *Radiocarbon dates* should be cited uncalibrated, using the convention bp, bc, ad to show that this is so. If calibrated dates are also presented, the convention BP, BC, AD should be used. Standard deviation and laboratory code should always be given.

9) *Abstracts*: a brief *résumé* of about 100–150 words should be supplied with each contribution, and will be printed at the end of the text.

10) *Submission date*: articles should be received not later than **1 April** for inclusion in that year's *Bulletin*. Articles will not be accepted unless complete with all illustrations, captions, etc. Twenty-five offprints of each paper will be supplied free to the author. Additional offprints may be purchased at cost price; estimates of cost can be obtained on application.

11) *Authors* are requested to supply a note of their institutional affiliation.

